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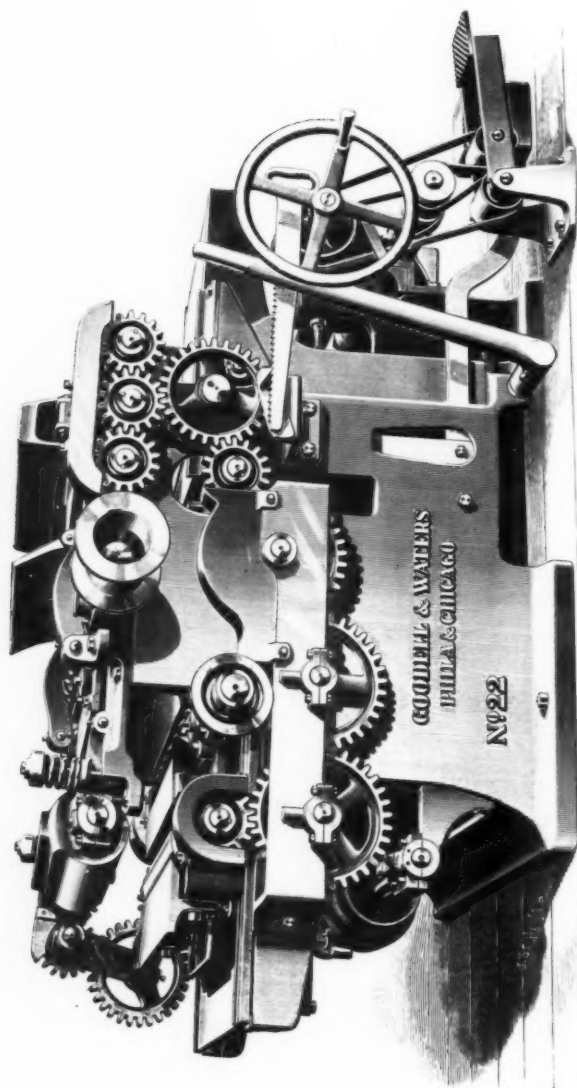
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THE PHYSICS AND CHEMISTRY OF DEVELOPMENT.

I.

BY THOMAS BOLAS, F.I.C., F.C.S.

HERE is a flat glass cell containing water, and the action or non-action of an electric current upon this makes a very good starting point in the study of the chemistry of development and exposure, a study of these two subjects being inseparably connected. I propose to set this cell in the lantern, and to connect the two platinum plates which are in the water with the terminals of the dynamo on the table.

Here on the screen are, you can see, the platinum plates in the water, and here the wires leading from the dynamo. As a matter of fact, scarcely any current passes, a mere trace, as indicated by an occasional minute bubble which may be seen rising from one plate or the other. Now, if it had been practicable to get absolutely pure water, probably there would have been no trace of current passing or of decomposition, and not a single bubble visible; but it is not ordinarily practicable to get pure water; even if one did get pure water, and put it into a glass cell, it would immediately dissolve some of the material of the glass, and the water would no longer be pure. You may take it that if the water had been pure there would have been no bubbles arising from these electrodes; in other words, pure water does not un-

dergo electrolysis in the ordinary sense. You will note one excellent feature about this optical lantern which Mr. Beard has furnished, and which he is managing. It is not subject to the aggravating defect of showing things upside down.

Now the dynamo is once more running, and while it is running I propose to add to the water a few drops of sulphuric acid; you at once notice that something happens. As the acid reaches the water we get a very active decomposing action by the electric current. You see between the plates a compact cloud of bubbles, so close that the mass of water looks almost opaque. Twice as much in volume of gas is evolved from the plate towards my right hand—that is the hydrogen, and half as much in volume of gas is delivered from the plate towards my left hand—that is the oxygen.

It is customary in showing this experiment to add the sulphuric acid, and then say that the electric current decomposes the water; but in decompositions by electrolysis, and in decompositions by light, which decompositions we may call photolysis, it mostly happens that the reaction is more complex than the mere decomposition of a compound of two elements. The ordinary text-book explanation of this experiment is somewhat after this fashion, and it is substantially accurate. Mr. Child Bayley, turning the handle of the dynamo, is exercising motive force; that motive force, going through a transformation into electricity, acts on the water, puts it into a condition of strain, and in a certain sense drags asunder the constituent elements of the water, the hydrogen being delivered at the negative pole, and the oxygen at the positive pole. Now, this action would be described in the text-book as *endo-thermic*,—that is to say, as one in which heat “goes indoors” or disappears. In other words, it consumes heat. When it is said the action is *endo-thermic*, one uses the word *heat* as signifying force or energy in general; that is to say, it consumes heat because any form of energy or force can be represented as heat, and it can be represented as equivalent to a certain amount of heat. So when we say the reaction is *endo-thermic* we mean it is *endo-kinetic*, it consumes energy, or energy goes in and disappears.

An action of this kind stops directly the source of energy ceases to supply force; and if we were to go on long enough we might decompose the whole of that water, but we should have to keep up the supply of energy for that purpose. The reverse action is said to be *exo-thermic*, and during such action, heat, or energy is given out. It is easy to show you the reverse action. In this bottle is a mixture of two volumes of hydrogen and one volume of oxygen. The explosion of this mixture in a soda-water bottle is a sort of stock lecture experiment, but I want you to attach more meaning to it than is ordinarily given to it. Remember that if you have a mass of this mixture, and you start a reaction between the two elements at any one point, that reaction will go right through the mass, because the action is *exo-thermic*, it gives out heat or force. You get a loud bang. What does that mean? It means that force is exercised; the product of that reaction—water-vapor—was in a condition of expansion, the whole thing became bigger, and it struck a heavy blow against the air, and that heavy blow against the air set the air in motion or in waves, and these became exhausted against the sides of the room, and we may take it as a matter of fact that the walls of the room are somewhat hotter for that reaction. The force appears as heat in the sides of the room, and some of it in your bodies and clothes.

This combination of hydrogen and oxygen may be made to give out the force quite gently and gradually instead of suddenly and with a heavy blow against the air. Hydrogen and oxygen are now adhering in small quantity to these platinum plates, which formed the electrodes in the decomposition of water, and by causing these minute quantities to combine, we cannot produce much force, still some can be produced by the force or energy arising from the union of the oxygen on the one platinum plate and the hydrogen on the other.

Mr. Beard will now kindly place this galvanometer on the stage of his non-inverting lantern; the galvanometer consisting of a large and heavy coil of covered copper wire across the top of which is suspended a minute magnetic needle. You now see the needle and the top of the coil, on the screen. The coil has,

at present, no action on the needle, but when a current passes through a coil, the coil becomes a magnet, and one end of the minute magnetic needle will be attracted and the other repelled.

I now connect the platinum electrodes with the galvanometer coil, the hydrogen and oxygen on the plates unite, force is generated as a current, and the needle is deflected; we get first electricity and then motive force. Mr. Justice Grove showed us the experiment many years ago; we have here his secondary battery; but it may also be a primary battery, quietly consuming oxygen and hydrogen obtained from any sources. Grove's gas battery consists, in its simple form, of two tubes standing over water, or rather dilute sulphuric acid; in each of these is a platinum plate which should be chemically roughened; if one tube is full of hydrogen and the other full of oxygen, and you connect the platinum plates by a wire, an electric current will be produced just as it was in the case I showed you, and that current might drive a motor engine, or do any other necessary work. The Grove battery is not a toy, it gives substantially the full energy which the gases are capable of giving on combination, and if one had an abundant and cheap supply of oxygen and hydrogen it would probably be an excellent source of electricity.

Now I am going to put that decomposing cell once more on the stage of the lantern, and I will get Mr. Child Bayley to turn the dynamo again, and this time not quite so quickly. I want you to see the individual bubbles, instead of getting the tumultuous decomposition that we had before. We shall soon find out which pole is yielding hydrogen and which is yielding oxygen, because we shall see that at one pole we can get very much more gas than at the other. Now you can see which is hydrogen and which is oxygen—there is obviously more gas escaping from this electrode than from the other. I reverse the current, please notice what happens: the bulk of the gas is now coming from the other plate; for a little while there was a diminution,—that is to say, until the gases accumulated on the plates had recombined. Now once more we will reverse;—you do not see the change the instant of the reversal, but a little while after.

Now I want you, please, to consider what is likely to happen

if, instead of taking a current which travels steadily in one direction, we take a current which travels first in one direction and then in the other, with frequent alternations. This dynamo is so arranged that one can obtain from it a constant current flowing steadily in one direction, or an alternating current of about the same power; that is to say, the alternating current which can be got from the other side of this dynamo is about equal in electromotive force, only it consists of rapid alternations, two for each turn of the armature. There is now very little gas arising from the platinum plates, the merest trace; what happens is this. A current passing in one direction deposits a few bubbles, or rather a film, of hydrogen on one plate, and a few bubbles or a film of oxygen, on the other plate. Then comes the current in the contrary direction, and does a reverse piece of work; it deposits hydrogen where the oxygen previously was, and oxygen where the hydrogen previously was, and these new deposits combine with the gases already on the platinum plates, and the effect of one impulse is neutralized by the next. If the conditions were such that no bubbles escaped from the platinum plates the total kinetical effect would be *nil*, putting aside a certain amount of current converted into heat, but in each impulse you would substantially receive back the work of the previous impulse.

Now, when you have the rapid alternations of current you have a constant tendency towards the liberation of hydrogen and oxygen, and in this particular instance you do in fact get occasional minute bubbles from the platinum electrodes; but these occasional bubbles will consist of oxygen and hydrogen mixed together, and they represent a certain amount of decomposition products which have escaped reunion. Speaking generally, when you pass an alternating current through an electrolyte—that is to say, a substance which is decomposable by electricity—it generally happens that the union of the decomposition products is not complete. Theoretically there should be union of the decomposition products after each alternation, but practically it is seldom complete; but least of all complete when there is any side agency present which tends to remove one of the products. When you pass an alternating current through an electrolyte, and there is any

agency present which tends to remove one of the products, a very considerable amount of permanent decomposition results.

Now, in the case of this decomposition of water there is no very ready means of putting in a tendency towards the removal of one of the products,* and therefore to illustrate the general principle I have propounded, I will take another electrolyte. In ordinary electrolysis, you always get the polar idea; that is to say, the leading idea is for one constituent to be liberated at one pole, and the other constituent at the other pole; thus if you electrolyse water, the hydrogen is liberated at one pole and the oxygen at the other; if you electrolyse a nitrate of silver solution the silver is liberated at one pole and the other constituent at the other pole. Here is a solution of nitrate of silver which I expose to the action of a continuous current, using carbon electrodes; the result will be that the negative terminal will receive a deposit of silver, and there will be no deposit at all on the positive terminal, because the substance liberated there will diffuse itself into the liquid, and undergo reactions which we need not here follow. You can now see the deposit of silver on the negative electrode. I might have taken silver plates, and if I had wanted to push the analogy of the latent image to the extreme I should have taken them; but they would have this advantage—you would not so readily have seen the deposit of silver. Here the negative electrode was at once covered over with silver, and there is nothing on the positive electrode. Now I am going to do the same thing with an alternating current. Even now there is a slight decomposition, and there is a trace of silver on *both carbon electrodes*, and substantially the same amount on each plate. Perhaps you have noticed that in order to get a sufficient deposit to show you I have had to get Mr. Child Bayley to turn the handle of the dynamo very much longer than before, because we get relatively to the number of turns a much smaller deposit of silver, but that silver is equally divided between the two car-

*Since the time of the lecture I have recognized that in this case, as in the case of the usual electrolysis, the greater solubility of oxygen in water, or possibly the tendency to form ozone on the one hand or peroxide of hydrogen on the other hand, may bring about such a removal of some of the oxygen from the immediate field of action, as shall determine an excess of hydrogen, or even a totality of hydrogen, in the escaping bubbles

bon terminals. In electro-plating with silver one does not use the plain solution of nitrate of silver, but a solution containing excess of cyanide of potassium, which gives a more even coating; but the rough crystalline deposit which the plain solution gives will answer our purpose equally well. You must, please, look on this as an experiment which may have a very fundamental importance in elucidating the action of light on photolytes, or substances which may be decomposed by light; and in this experiment and others like it we probably have to a great extent a faithful picture of the action of light on an ordinary photolyte. In ordinary photographic actions, and perhaps I may say in all photographic decompositions, you have two processes at work—a tendency of the light to decompose a substance, and a tendency of something, which is called a sensitizer, to remove one of the decomposition products, and that is what you have here. Supposing each alternation completely undid the work of the previous impulse—the group NO_3 liberated from the silver at one impulse would always unite with the same quantity of silver at the following impulse, and there would be no ultimate electrolysis. But, as a matter of fact, there is a very considerable ultimate result. It arises in this way. The deposited silver is a solid, compact, hard substance which adheres to the electrode, and has very little tendency to dissolve in ordinary reagents; moreover it has no tendency to diffuse away from the centre of action. The group of the nitrates (NO_3) has, on the other hand, a very great tendency not only to diffuse through the water, but to react on the water producing new products, as nitric acid; the water is then an agency which constantly tends to remove the NO_3 from the seat of action, so that the water is in this case the sensitizer,—that is to say there is a constant strain towards the removal of NO_3 from the seat of action. The consequence is, the silver accumulates on both electrodes, and the NO_3 diffuses itself through the water, forming, probably, free oxygen and nitric acid; and after you have passed the alternating current through the nitrate of silver for a length of time, the nitrate of silver, at first neutral, becomes acid from the presence of this nitric acid.

Now, this action of alternating currents on electrolytes seems to me a very general one when there is a tendency to remove one product; and perhaps you will not mind if I emphasize what I look upon as a very important fundamental fact by another experiment. Here is a decomposition cell in which are two strips of silver, and into this cell I am going to pour some solution of sulphate of copper. I think we all know what happens when we pass an electric current through a solution of sulphate of copper; the copper is liberated at the negative terminal, and the other constituents of the sulphate of copper are liberated at the positive terminal, the copper being only deposited on one of the electrodes. Now we pass the alternating current. As before, there is no visible disturbance, but the silver plates gradually become covered with copper, *and both to the same extent*. In this case the copper and the other constituents (SO_4) are both liberated equally on the two plates; there is a tendency to wash away the SO_4 , and for it to react with water, forming sulphuric acid and oxygen, and consequently for the copper to remain on both the plates. This liberation of metals by alternating currents is very much slower than the ordinary process of electrolysis. Experiments on this alternating electrolysis seem of great interest, and there are many which you can do for yourselves quite easily: this being apparently an interesting field for work.*

Quite early in the history of photography we had electrical views of the action of light on photolytes (that is to say, substances decomposed by light), and one of the earliest was put forward by Dr. J. Schnass,† in 1853. He suggested that a substance like silver chloride, when exposed to light, is set into a condition of electric tension, which enables it to attract a precipitate when in a nascent state. Now, that does not bring in clearly the usual ideas of electric action, and perhaps is not very much

* The alternating current and light act quite similarly upon a solution of mercuric chloride; calomel being deposited and chlorine being liberated (or its reaction products upon water). In such cases both the agglomerative tendency of the solid insoluble product and the tendency of the other product to wander away in the liquid from the immediate field of action, may alike be regarded as the "sensitizing" or determining agencies, in those cases of alternating current actions herein mentioned.

† *Archiv der Pharmacie*, 1853, p. 6.

more than a suggestion. Later on Dr. Schnass classified developers as electro-negatives, and the latent-image as electro-positive, and it is here that we get the polar idea, that is to say, the polar idea corresponding mainly to a constant current. Now, the polar idea, and where to put the polar points, has been the stumbling-block in the various electrical views of the latent-image, and in electrical views of the action of light. We see the same stumbling-block in the view of Mr. Nelson K. Cherrill, who in 1866 published † papers on the subject, and he assumed that the metal tends to turn towards the source of the light. In 1867, Sytenko, who was at that time Captain of Artillery in the Russian Army and head of the photographic establishment of the War Department at St. Petersburg, published a view of the latent image‡ and the action of light which was perhaps a little nearer. He assumed a molecular current which tended to separate but did not quite separate, but in development a more definite current or extra strain arises; still, he is not quite clear in the sense that his explanation ranges completely with our knowledge of electricity, that is to say, they are left somewhat vague, but Sytenko was perhaps one of the first to put forth the idea of the electrolytic tendency rather than electrolysis.

Let us go back for a moment to one of the early processes of photography; photography on the Daguerreotype plate, where we have, perhaps, the simplest conditions. The silver surface on which the film of haloid is formed—(the copper backing is out of the way altogether, and has nothing to do with the reaction)—we have the silvered plate, and that is exposed to the fumes of iodine or bromine, or both, a layer of the pure silver haloid being formed by direct union. When this is exposed to the action of light there is a constant tendency towards separation, and there is a constant tendency to remove from the field of action one of the constituents. There is obviously no tendency for the silver to fly away and diffuse itself in the air, but there is a constant tendency for the iodine to fly away; so that in the Daguerreotype plate the air may be regarded as the sensitizer or agency which

† *Photographic News*, 1866, p. 100-112-123

‡ *Photographic News*, 1867, p. 406.

tends to take away one of the constituents, and without a sensitizer there seems to be no case of phtolysis.

Now, incidentally one may mention that the silvered plate behind the film also acts to a slight extent as a sensitizer, because if you expose the plate to strong light, an image is really formed and etched on the silvered plate, that is to say, the haloid which tends to be liberated, or is liberated, attacks the plate; but I take it that even in respect to this action the air is in the main the sensitizer, and is the vehicle by which the haloid reaches the silver backing.

—*British Photographic Journal.*

(*To be continued.*)

RETOUCHING SURFACES.

TO the professional photographer the question of retouching surfaces presents in a way no features of interest, for the mere reason that he employs others upon whose shoulders falls the responsibility of the work; and amateurs, as a rule, do not trouble themselves very greatly with anything in the shape of retouching. But there exists a very large army of artists, both male and female, whose whole business consists in the improvement of negatives, and whose livelihood depends very materially upon the rapidity and ease with which they can get through the task of work. We read recently of one establishment where the tale is, thirty negatives between the time of starting in the morning and "lunch time," and thirty more before five o'clock in the afternoon—a truly handsome day's work at "popular prices."

This may, of course, be an exaggerated story, but in any case it is a matter of impossibility to turn out any really good work at such a rate, however favorable the conditions of working may be; while to take the ordinary run of negatives as they come from the developing room, requiring all sorts and different kinds of treatment, both artistically and mechanically, it is scarcely possible to believe that any human being would undertake the task, except under the most severe compulsion.

But a great deal might be done by the operator—or, we will say, the photographer—to assist the retoucher and to alleviate his difficulties if it so pleased him; but, as a rule, the operator does not care two pins for anything beyond his own range of duties, and consequently the poor retoucher has to take things as he finds them, and in that condition they are not always as enjoyable as they might be; but, where the operator is also proprietor, or where the proprietor takes an intelligent overlook of his establishment, he may well give a little attention to the matter of turning out negatives that will give as small an amount of trouble in the retoucher's hands as may possibly be.

From one point of view this is, no doubt, done—that is to say that, so far as proper exposure, and density, and lighting are concerned, the operator has to keep within certain bounds or he will hear from both retoucher and employer; but, in the matter of the more mechanical or chemical turn-out of the negative surface, the retoucher is left almost entirely at the mercy of the one who develops the negatives.

There are many different methods of treating negatives previous to retouching. We have varnishes, ordinary and special, for retouching, retouching mediums, and preparations of one sort and another for bringing the surface of the negative film into a proper or comfortable condition to "take" the pencil, but we never, or hardly ever, hear anything of any attempt to bring the film itself into apt condition in the course of development; yet, to any one who has tried the experiment, it must be very quickly palpable that a very great power lies in the hands of the operator or developer of plates to assist or retard the retoucher in his work. As most of our best retouchers prefer to work first upon the film itself and to "finish" after varnishing, it may very well repay to give some little attention to the preparation of a suitable retouching surface by chemical means or by treatment of the film during or after development.

To illustrate what we mean, let a comparison be made between the surface of two negatives, taken upon precisely the same kind of plate, one of which has been simply developed, alumed, and washed, the other intensified with mercury. The one will present

a hard polished surface, upon which it is absolutely impossible to produce any practically useful impression without having recourse to a retouching medium, or, more probably, to varnishing first. The other, while exhibiting an equally hard film, will offer a "tooth" to the pencil and a surface for working on that throws any retouching medium or varnish that we have ever met with far into the shade for any but very hard work; in fact, we question whether, on a fairly good chemically prepared film such as this, more "lead" cannot be got on than on any varnish or medium now in use.

The surface, in fact, presents an actual "grain," fine, it is true, but sufficiently marked to take the lead and to go on taking it after the first application, which is more than most of the varnishes and mediums will do, as with them the first touch, light or heavy, settles the whole business, and, short of revarnishing, nothing more can be done. Grain varnishes have been tried, but, so far as we are aware, have not proved a very marked success, owing to the difficulty of getting a sufficiently fine and, at the same time, pronounced grain. We speak now of a mechanical grain, formed by the addition of some pulverulent material to the varnish; but in the old collodion days a different class of grain was obtained by adding chemical substances to the varnish, a practice not now permissible, owing to the comparatively tender nature of the gelatine film. The so-called *matt* "retouching varnishes" come under one or other of these heads, but they are really more fitted for application to the reverse side of the negative than to the film side for ordinary retouching.

But by suitable treatment of the gelatine film before drying, or it may be simultaneously with development, it seems to us that a far better result may be arrived at than by any of the methods in common use. It is true we cannot resort to mercurial intensification of all our negatives, though that treatment, when admissible, affords every satisfaction the retoucher could desire, and unfortunately the beneficial action of the mercurial salt cannot be secured without its other effects. There are, however, other means which may be resorted to for producing a fine grain without in any way injuring the negative.

—*British Journal of Photography.*

WATER AND ITS EFFECT ON OUR WORK.

BY DUNCAN MOORE.

THE purity and brilliancy of our transparencies and negatives are considerably influenced by the quality of the water used in their preparation. Chemically-pure water exists mainly in theory, rather than for any available supply. Distilled water being the nearest approach to it we are likely to get, and that very often is far from what it professes to be. The mystical capitals HO represent the chemical constitution of water, but the component parts of the water we have to avail ourselves of would be more nearly represented by all the letters in the alphabet. Pure water consists of a mixture by weight of eight parts of pure oxygen gas with one part of pure hydrogen; if it contain anything else it must exist as an impurity. The sea is the primary source of all water, by evaporation; it is carried over the land by clouds, and is discharged from them as rain, to afterward present itself as river, spring, and well water. Rain water, if collected at a long distance from towns, or manufactories, or other sources of contamination, and at a great altitude, is the purest form of natural water, but even under these conditions it is not absolutely pure, as a certain amount of foreign matter floating in the atmosphere is carried down with it. That, however, collected near towns is on the contrary extremely impure, the air being greatly contaminated with ammoniacal and other detrimental vapors that impregnate it, to say nothing of the thousand-and-one impurities in the dust lodging on the roofs, etc., from which the water is gathered. It is always best in collecting rain-water from any source to allow the first of the shower to pass away into the drains before reserving any for photographic use. If this is done, and the water well filtered before use, it will be found tolerably pure, and good enough for most photographic operations. The most important photographic use necessitating pure water, is making solutions of silver nitrate, in which case any contamination of organic or saline matter would cause decomposition. If it so happens that there is no choice of water, and a known

impure sample is to be used, the best plan is to first boil it in order to precipitate any lime, afterwards add a few grains of silver nitrate and expose to the brightest sunlight available for a day or two. The organic matter will by this means be precipitated as a black mud, and although the water thus treated will not be absolutely pure, still it will be sufficiently so for most purposes, after filtering, in which silver nitrate has to be dissolved. Spring water and river water are next in order of purity, but (there is a great deal in this "but") it altogether depends on the soil through which the spring flows. Springs are caused by rain fall on higher grounds, through which they filter, and in their course dissolve any soluble matter in their passage. In chalky soil, spring water is saturated with lime, but is tolerably free from organic impurities. If we take such water, clear and sparkling as it may appear, for development in which oxalates are used, we immediately get into difficulties by a precipitation of oxalate of lime in our films, which causes a granular, muddy appearance, unfitting the transparency for lantern work; in fact, any development in which lime-salts are decomposed or precipitated, indicates that such water should be deprived of its lime by boiling for a considerable time. Lime, however, is not the only substance likely to be found in spring water; chlorides of various kinds, metallic impurities, more especially iron, magnesium, and soda, as we see by our medicinal and chalybeate springs. The earth surrounding and over which the spring flows, when iron is contained in solution, proclaims its presence by the rusty color of the precipitated oxides.

Sulphates and chlorides are, of course, not noticeable in this manner, but detectable by taste when they occur in important quantity. Hydrates are frequently present; in fact, almost always, their quantity or character depending mostly on the soil through which the water flows. Water is one of the most powerful solvents known, and at various temperatures few things are not more or less soluble in it; even glass is, by its long continued action at a high temperature, corroded away. It is, therefore, easily understood how it becomes almost impossible for such a fluid to be anything like pure in a natural state. Water proceeding from glaciers and snow on lofty mountains is its purest form.

River water is a mixture of drainage and spring water, and of necessity much more impure, being additionally contaminated with organic matter in all forms. Putrefactive and excretive matter is being continually added, but by a fortunate dispensation of Nature they soon become oxidised and deposited as mud, forming a nutritious soil for plants and vegetables of various kinds, the plants in their turn further purifying the water in which they grow by the absorption of various earthy salts that are contained in solution. So the process continually goes on—addition, decomposition, absorption, and purification, until the main bulk of the stream becomes bright and usable. The pollution of the water by manufactories is sometimes carried to such an extent that a river becomes little better than a sewer. Water from such a source is evidently useless for photographic purposes, as no amount of filtering or subsidence will remove the obnoxious matter, distillation being the only possible means of making it suitable.

Rivers flowing through sandy and gravelly soils are generally purer than those where the bed is of a clayey or chalky character. River water is usually termed soft; that is, the sulphates contained in it are insufficient to curdle a solution of soap. Hard water, which contains a superabundance of these salts, has an opposite effect. Well water varies in its composition more perhaps than that from any other source; the depth of the well and kind of soil in which it is sunk, and the various sources of contamination that are in the vicinity which percolate into it. As a general rule, well water obtained from diluvial gravel above the clay is more impure than from the green sand at a lower level, and water from wells sunk in the London clay are the most impure of any, and contain on an average three times as much solid matter as deep Thames water. A good, pure, natural water is without odor, although the finer senses of some animals can detect it at a distance. Muddy water may be cleared by adding two or three grains of alum to a quart of it, then allowing it to subside. This effect is produced by the alum combining with the lime in solution, and forming an insoluble precipitate, which carries down

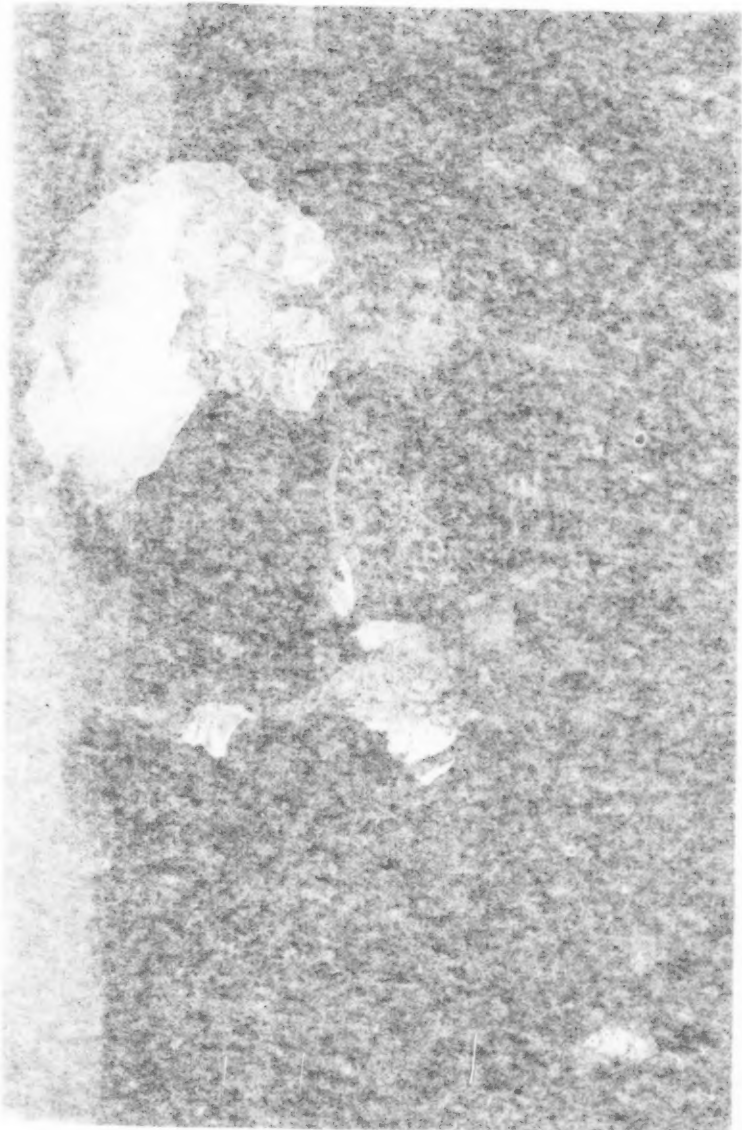
other matter with it. For photographic use all natural waters should be well boiled and allowed to subside or be filtered.

Water purified by distillation is the best for all chemical purposes. It often happens that water sold as distilled water is far from pure, being contaminated by the vessels in which it has been stored, from the luting of the apparatus in distilling it, or from some other reason that could have been prevented by care. Good distilled water should be bright and odorless, and not show the least opalescence on the addition of silver nitrate. Should it be at all turbid or have the least smell, it may be safely concluded that it is impure, even if the silver nitrate test is satisfactory. Organic matter of some kind is in all probability contained in it, Lead is more easily corroded and dissolved by pure water than if it contains nitrate, carbonates and sulphates. Distilled water, therefore, should never be stored in lead receptacles; glass or well-glazed earthenware is best. Distilled water procured from the condensing engines of steamers or manufacturers' stationary engines is rarely free from oily matter; sometimes it is fairly good, but at others far from it. At any rate, it will not be wise to trust to the purity of water obtained from such sources.

The water supply of most large towns is tolerably pure, but it should not be used for photographic purposes, such as development, without filtering it through two or three thicknesses of fine flannel, or swansdowne calico. A bag of this material may be fixed over the supply tap and form a permanent filter, taking it off and washing occasionally is all the attention required. It is surprising, even when the water seems bright and good, what a quantity of foreign matter will soon accumulate in this bag. It should also be boiled and allowed to stand before use. Many of the defects on negatives, and sometimes fogging, may be traced to the use of impure water, when its appearance may have been all it should be.

As a matter of course any defect in a lantern slide is enlarged; those that would pass muster in an ordinary printing negative would ruin a transparency; therefore any little extra trouble in ascertaining the water is not at fault is amply repaid by the clear, neat, and finished appearance of the slide. —*Magic Lantern.*

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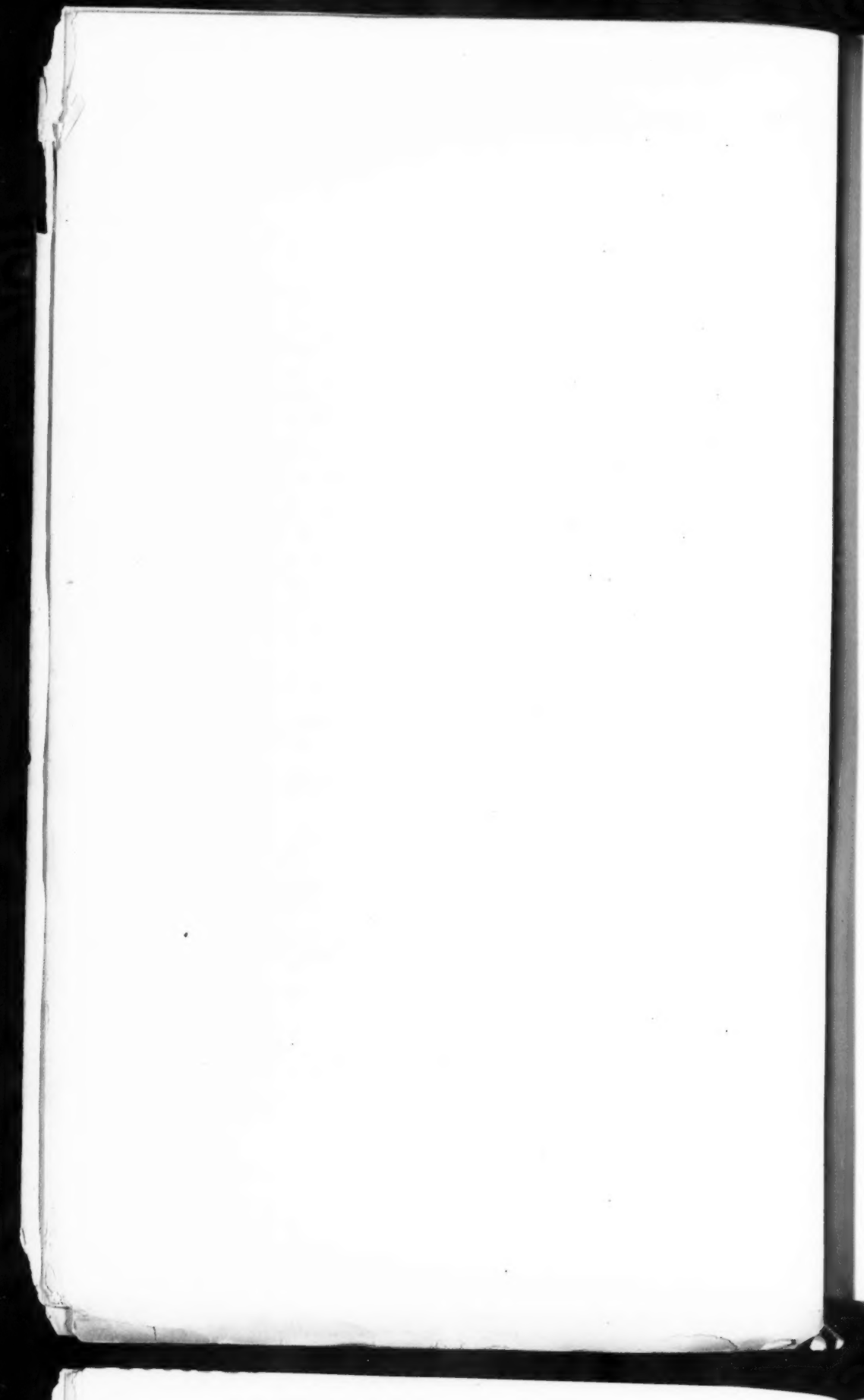
AMERICAN JOURNAL OF PHOTOGRAPHY.

JUNE, 1895.



"LITTLE CURLY LOCKS."

CHILD STUDY BY MRS. N. GRAY DARTLETT.



THE DAWN OF PHOTOGRAPHY.
EARLY DAGUERREOTYPE DAYS.—VIII.

BY JULIUS F. SACHSE.

IN a former contribution to the history of the heliographic art,* by the present writer, mention was made of two advertisements cut from the *Public Ledger* of December 30, 1843, just about half a century prior to the time of writing.

The first offered for sale a daguerreotype outfit, by Voigtlander, of Vienna, made according to Professor Petzval's calculations. No name was signed to this advertisement, it was merely stated to inquire in "Dillwyn Street, first house above Noble, East Side." †

The other advertisement was signed by William Langenheim, ‡ Exchange Building, Rooms 26 and 27, Philadelphia, and offered for sale any and all apparatus and chemicals requisite for the making of daguerreotypes.

Next to such scientists as Dr. Paul Beck Goddard, Joseph Saxton, and Prof. Martin H. Boyé, who were all so prominent and active in the perfection and development of the art and science of heliography, and Robert Cornelius, who was the pioneer professional portraitist, the names of William and Frederick Langenheim are best known in the practical development and perfection of the heliographic art in America.

It is to these early pioneers, together with their confrere, George Francis Schreiber, that these pages are devoted, and it will not only be the object of the writer to show how much credit is due these early experimenters, in the development of every branch of heliography, optical, chemical and photo-mechanical, and how they obtained control of Fox Talbot's patent for America, and eventually brought about the use of glass negatives, in place of

* Early Daguerreotype Days, VII., AMERICAN JOURNAL OF PHOTOGRAPHY, August, 1893.

† The advertiser was George Francis Schreiber.

‡ As a matter of fact, William Langenheim was in Europe at the time, and the business was in charge of Frederick Langenheim.

the uncertain and crude waxed paper supports; but as a culminating triumph gave to the world the photographic lantern slide, the same as is now in universal use throughout the civilized world, wherever the camera and sensitive dry-plate have penetrated.

Then they were the first to introduce into America, regular standard lenses, apparatus and other requirements.

The writer will show how intimate the connection of the two brothers was with the leading European optician who was the first to make a strictly photographic objective, also how by virtue of this connection Philadelphia became for years the chief distributing point for photographic lenses and apparatus in America, as well as being the city from which emanated every actual improvement in the art of heliographic portraiture.

The Daguerrean Miniature rooms, established in 1842 by W. and F. Langenheim in the old Merchants' Exchange building at Third and Dock Streets, are even to this day remembered by the older residents of Philadelphia, and many a family has specimens of their art, and bearing their imprints, which are now treasured as priceless heirlooms.

At the time when the Langenheims opened their rooms, Cornelius had retired from the business, and the only gallery open in the city was an indifferent establishment on the north side of Chestnut Street, three doors above Fifth street, (old number 173), operated by John Plumbe, Jr., who conceived the idea of establishing a chain of galleries in all the large cities of the United States.

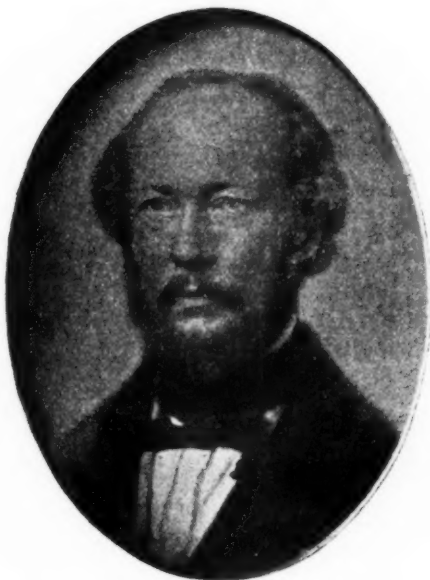
No attempts were made to produce artistic or superior results, consequently, so far as known, none of his early specimens have been preserved. His venture, at least at that early date, had little or no effect upon the development of heliographic portraiture, unless it may have tended to popularize the art with the masses.

The only matter worthy of note within the period concerning Plumbe outside of his enterprise, is the fact that he was the first photographic professional who attempted to cut prices, a departure in which he has had numerous imitators within the last half a century.

Consequently when the Langenheims entered the heliographic profession they virtually had an open field without any competition worthy of the name.

There is more or less romance connected with these two pioneer heliographers, which will well bear a recital in connection with our history of the development of the photographic art science.

The Langenheim brothers were natives of the Duchy of Brunswick in Germany. William the elder brother emigrated to America, together with one Francis Dietrich, in 1834, and went



W. Langenheim

From a Daguerreotype taken in 1843.

to the colony of one James Power, in Texas, where they bought a tract of land on the Aransazu Creek, near the crossing of the road from Goliad to San Patricio.

In the year after their settlement there, hostilities broke out between the settlers of Texas and the Mexican government, a

struggle which eventually was destined to lead to Texan independence, and it becoming one of the States of the American Union.

William Langenheim at once espoused the cause of the patriots, and offered his services to Captain Demmit, who was then in command of the patriot forces at Goliad, which post had been wrested from the Mexicans a few days before.

The first duty of the young soldier was to serve in an escort to Dr. James Grant, and John Cameron, to the headquarters of General Stephen F. Austin, who was then encamped near San Antonio de Bexar. Here he joined Captain Poe's Battery, with which he served until the capture of San Antonio. He was in the storming party, and was promoted for his valor and skill during the siege.

At the subsequent reorganization of the Texan army, he was transferred to Dickerson's Battery, then stationed at the Alamo. Early in the year 1836 he was detached and transferred to an expedition which was organized to operate against Matamoras. It was by this fortunate circumstance that the young German escaped the horrors of the massacre at the Alamo on the 6th of March following.

The expedition against Matamoras was also doomed to come to grief, and among the captured was William Langenheim, now a first sergeant, who with his companions was thrown into a Mexican prison. A few days later he was sentenced to be shot, but escaped this fate by the intercession of a number of Mexican women, who protested against such wholesale slaughter. He was, however, kept in a filthy prison for eleven months, and was not released until after the capture of Santa Anna, at San Jacinto, when the latter's life was spared on condition of a general release of all Texan prisoners held by the Mexicans.

From Matamoras, the subject of our sketch went to New Orleans, thence up the Mississippi to St. Louis, where he enlisted in May, 1837, in the Second Regiment U. S. Dragoons, where he served as Commissary Sergeant in Captain Lloyd J. Beale's Company against the Seminoles in Florida.

After his term of enlistment had expired he was discharged, and in May, 1840, we find him in Philadelphia, where to his surprise he met his brother Frederick, who had just arrived from Europe.

The two brothers now concluded to remain in the city of brotherly love for a time, and looked around for some congenial



GEORGE FRANCIS SCHREIBER.

From a Daguerreotype taken in 1843.

employment; both had received a liberal education, the elder had studied law, while the younger had devoted himself to agricultural economy. They did not have long to wait before an opportunity presented itself, as before long we find the elder brother installed as an editorial writer, with his brother in a subordinate

capacity, on Philadelphia's German newspaper, *Die Alte und Neue Welt* (The Old and New World), a venture which had been started a few years previously, in a small way, by one John Schwakke as editor and publisher, with George Francis Schreiber, a German printer from Frankfort on the Mayn, as compositor and printer.

The quartette proved a congenial one, and the two brothers were soon domiciled in the humble home of the Schreibers, on Dillwyn Street above Noble.

We will here leave the subjects of our sketch for a short time, so as to refer to another branch of the family, who were destined to become a chief factor in the development of the photographic art-science, even down to the present day.

Among the scientists whose serious attention was drawn to Daguerre's crude invention about this time, was one Johann Schneider, of Brunswick, who was a Professor of Mechanics at the local Polytechnic Institute.

Among his pupils there was a young man, Frederick Wilhelm Voigtlander, a son of Frederick Voigtlander, an optician of some note in Vienna.

Prof. Schneider, on September 15th, 1840, married Louisa Langenheim, a sister of the two brothers then sojourning in Philadelphia. Prof. Schneider was more or less successful in his heliographic experiments, and together with the elder Voigtlander, constructed a unique apparatus for portraiture.

After this curious apparatus was thought to be perfect, a specimen, together with a complete outfit of apparatus and chemicals, with instructions, was packed up, and sent by Prof. Schneider to his brother-in-law in Philadelphia, to astonish the scientific world here, and perhaps open a mine of wealth for the inventors. This was prior to the calculation of the orthoscopic objective by Prof. Petzval.

When this outfit consigned to Frederick Langenheim arrived, after a long delay, caused by the slow and uncertain means of transportation of that day, it naturally caused a great commotion in the little newspaper office on North Third Street, and for a time the curious brass apparatus, in a carefully-made, velvet-lined

mahogany case, in which it was fitted, similar to fine microscopes at the present day, proved an object of curiosity to the passers-by, as well as to the few scientists to whose notice the apparatus was brought.

Yet the scope of this bright polished brass apparatus, with its careful construction and mathematical adjustment, was to produce a portrait somewhat after the style of the miniature of that period, say about an inch in diameter. In fact that was all that it was thought in Europe the Daguerre process would ever be capable of.

In contrast to the above it must be borne in mind that pictures by Cornelius, Goddard, and Parker, had been made and exhibited months before on plates 4 x 6 inches, and even larger, the apparatus used being either the tin cameras of Cornelius, or the simple wooden boxes made by Joachim Bishop, of Laurel Street, Philadelphia, as was pictured in *THE AMERICAN JOURNAL OF PHOTOGRAPHY*, December, 1892.

The two Langenheim brothers, being naturally intelligent, together with Schreiber, who was not only a good mechanic but somewhat of a chemist as well, soon mastered the theoretical part of the instructions sent. The outfit was then taken to the home of the Schreibers, and several practical experiments made in the practical working of the process on the roof of the Dillwyn Street house, the children of Schreiber being used as subjects.

As soon as the art and mystery of the process were mastered, their patron and employer, Schwakke, was invited to come up and have his miniature taken by the new sun process. This sitting, made in the bright sunlight on the roof, after several attempts proved successful, and the original daguerreotype, set in a brooch, is still in possession of the Schwakke family.

An exact fac-simile of the original is reproduced to illustrate this paper.

A similar camera to that with which this portrait was made, only as afterwards greatly improved, was fully described in the



JOHN SCHWAKKE,
Fac-simile of Daguerreotype
made with original Voigt-
lander lens and outfit,

sixth paper of this series (AMERICAN JOURNAL OF PHOTOGRAPHY, December, 1892), and to which further reference will be made.

From now on the trio of experimenters continued to perfect themselves in the new heliographic art as well as they could with the limited material at their disposal, in the firm belief that there was a brilliant future in store for the new process.

While these crude experiments were being made here in Philadelphia, a great advance had been made in Germany. Professor Petzval, of Vienna, encouraged by Ettinghausen, applied himself during the winter of 1840-1 to the investigation of the photographic objective, the first practical result of which was the completion of a formula for a photographic objective to take the place of the single lenses theretofore used.

In the course of Petzval's investigations, he came into contact with Frederick Voigtlander, who not only furnished the glass for the refracting and diverging indices, but also constructed the first portrait objective according to Petzval's compilations.

Petzval's calculation of the light strong double objective proved to be as great a stride forward in photographic optics as Dr. Paul Beck Goddard's application of bromine had been in photographic chemistry. Upon these two improvements rests the whole structure of photography, and all of the multitudinous ramifications of the art at the present era owe their existence to the above two sources.

No sooner had this great improvement in the objective been assured, than the Voigtlander camera was also enlarged and improved so as to take a larger picture, but still round or oval; they were of a fixed focus, the only adjustment being by the ratchet in the lens tube.

To be continued.

When Christian education is completed in the heart, there will be a readiness to assign the best possible motives to all human action, at least in the absence of the clearest evidence to the contrary.—
Joseph Parker.

TRUE AND FALSE PERSPECTIVE.

OUR German contemporary, *Das Atelier des Photographen*, under the able editorship of Dr. Adolf Miethe, and which is always brimful of practical advice and suggestions for the photographic portrait artist, in the current number devotes several pages to true and false perspective, showing the relative effect of the position of the Camera upon the portrait of the sitter. This is illustrated by a simple experiment made with a ball or sphere and a piece of chalk or crayon. Four strokes of equal size are made upon the one side, representing the eyes, nose and mouth of the human face.



Fig. 2.



Fig. 3



Fig. 4



Fig. 5

We have here four illustrations, the first three, 2, 3, 4, taken from the same standpoint. No. 3 is an illustration where the height of the camera was normal or directly upon a line with the subject, in No. 4 the camera was too high, No. 2 shows the result of having the camera at too low a plane.

No. 5 serves to illustrate cases where the camera is placed too near the sitter or a too short focus lens is used. The height of camera was the same in No. 3 and 5.

A study of the four illustrations shows how comparatively easy it is to give a portrait a false or altered expression. Thus where No. 3 shows the mouth small and eyes contracted, No. 5, on the contrary, shows an extended mouth, with eyes angular and separate.

As a matter of course these conditions are even still more aggravated in the human model, where in place of the plane surface here presented, we have to contend with protrusions like the nose and ears, and cavities like the mouth and eyes.

The relative position of the camera is not only of importance in taking head or bust portraits, but becomes of even greater importance where a full-length portrait is attempted; when the camera is set too high the figure appears shorter than the original, and *vice versa*, when set too low the portrait is apt to appear of an abnormal height.

Thus it will be seen that in many cases the so-called distortion or false perspective in a photograph is less the fault of the focal length of the objective than of its improper application, or the result of carelessness or ignorance of the operator.

Attention is also called to the effect caused by the use of too small or unsuitable stops with portrait lenses. As an illustration two portraits are submitted, both taken from the same position, the difference being in the size of stop used. Where the first exposure, made with an *f*-19, shows the features in a normal condition, the other one, made with lens stopped down to *f*-65, shows face with a puffed-up or swollen appearance, with receding ears, and mouth and eyes much too wide.

The above subjects, both important factors in photographic portraiture, have thus far received far too little attention from the profession, and it is to be hoped that the simple experiment here presented will bring the study of true and false perspective prominently before the profession at large.

J. FOCUS SNAPPSCHOTTE.

The Valkyrie.—Elaborate preparations have been taken to prevent a photograph being taken of the new yacht "The Valkyrie." The Valkyrie III was not launched as was expected on May 25th, according to a Glasgow special, the tide being too slow. Every preparation had been made for launching her, and the invited guests were all assembled, but at 1 o'clock Designer Watson and his party left the slip, after the announcement was made that the launching would be attempted on Monday. The most elaborate precautions were taken to prevent the taking of a photograph of her. Two large steamers were moored next to the bank of Kelvin, opposite Patrick where the yacht was built, and these entirely obstructed a view from that side.

PHOTOGRAPHY AS A BUSINESS.

PARADOXICAL as it may appear, the very qualities which should make a young man fitted to join the ranks of professional photographers really unfit him for the undertaking; the more refined and exquisite his taste may be, in all probability, the worse he will succeed with the business. Because a youth shows a taste for drawing, that is no reason why the nearest photographer should be asked to take him as a pupil or apprentice. The boy who will get on as a photographer will get on with any other trade. The better business man and the less of the artist there is about him the more successful business will he, in all probability, be able to build up.

Let us enquire why the boy highly gifted with a keen perception of the beautiful is not one likely to succeed, when photography is considered to be a business requiring the display of an artistic feeling and cultivated judgment. In the first place his artistic efforts will not be understood by ninety-nine out of a hundred customers. The ninety-nine, being entirely wanting in æsthetic feelings, will not be able to distinguish between good and bad work. What, therefore, is the use of a photographer being an artist just to please one customer out of a hundred? To please the hundred he should have rather a minute than an artistic sight, for the tiny spots which somehow or other will find their ways on to prints in the best regulated establishments are far more seen than any broad effects of lighting. A pair of powerful spectacles is of more use to the photographer than the most comprehensive knowledge of the principles of light and shade. Then the boy whose artistic faculties are highly developed is, oftener than not, highly wanting in many qualities which go to make a successful business man. The copy-book qualities—quickness, promptness, punctuality and accuracy—are indispensable, but these things are not always born in the boy in question. Artists do not like to be hurried, and the business has to rush on at a furious rate, and many little things, such as skill in book-keeping and letter-writing, which the artist seemingly

forgets while absorbed in his work, are really of far more importance in business than the work itself. The youth who is blessed with the artistic soul seems to be often blind to many things which require constant attention in business; he never seems to notice the dust, and the lumber, and the litter in his studio and waiting rooms, which keep trade away. Photographers never seem to realize that dirty, untidy studios and rooms keep away scores of customers, and, when one thinks of it, as most of our sitters are ladies in their nicest dresses, and babies and children in their whitest frocks, we cannot blame them for not wishing to soil their clothes by contact with the photographer's greasy, dirty, sooty accessories, or expect them to look contented and happy in an atmosphere of faint tobacco smoke. Even children who have been carefully attended to since their birth have a natural horror of dust and untidiness, and we have heard a young man of four or five summers exclaim, on being asked to sit down in a photographer's studio, "Oh, no, I could not think of sitting there, for I've got my best clothes on!"

There are other qualities, virtues, we perhaps should call them, which seem to accompany the artistic one, but which rather hinder than help anyone in business, for artists, like sailors, are a free handed and generous race, and are always willing to give their time and their assistance to others. This generosity is sometimes taken advantage of by those of a more grasping turn, and, after many years, it sometimes dawns upon an artist that the best part of his life has been spent in toiling for strangers. Besides, this open-handed generosity, if continued for a few generations, supposing our subjects to come of an artistic stock, must, in time, impoverish the most prosperous estate, and beget an indifference, if not a contempt, for that most needful thing, a careful care of dollars and cents.

It seems hard to say so, but a successful photographic business nowadays is one which is to be bought for cash and get every possible discount; what is true of other businesses is true of the photographic; there is no exception. Then, too, artists, as a rule, are bad hands at blowing their own trumpets, and of what use is a business of any kind without advertising, but

what man of any honesty could unblushingly descend to the depths of the modern style? No, he would rather throw the trumpet into the depths of the sea than court notice in such a way. If his neighbor's business increased because his neighbor adopted all kinds of what he might consider "unprofessional" puffing, his neighbor would laugh at him, and say, while he patted his comfortable waistcoat, "My dear boy, you must not ride such a high horse; anyone would think you were a medical man who *must not* advertise instead of a free and independent photogaapher. Don't you see it pays better to get twelve fresh customers every day by advertising largely, than to keep one old customer for a lifetime; people nowadays are always on the lookout for something which is given away. This is the secret of my success. I offer to give them a framed colored picture for nothing; perhaps these pictures would give you the creeps, but it pays, and that is the main thing."

If our would-be photographer thinks he can carry on a successful trade by simply doing good work he will have a hard time of it. If proof is wanted, one has only to look at the business success of that most gifted photographer, O. Rejlander. Though patronized by the Prince Consort, and though far ahead of most other photographers of his time, what support did he get from the public, and what reward did the unsurpassed productions of his camera bring him? A sorry one, we fear. But let us hope that his work gave him more pleasure than the want of appreciation caused him pain, for though to the world a photographer is a business man, and is judged by the world by the success he achieves, and is pitied if that success is not such as is to be envied, he has, in the practice of his calling, one consolation the outside world knows but little of, the pleasure of making pictures, and though these may for a long time be looked at askance by the multitude, a time may come when they will be understood. And though it seems almost utopian to hope that some day or other photography will not be considered a *business*, but a *profession* of honorable men, there are signs of a movement in this direction, for two or three amateurs, whose works show undoubtedly that there is more poetry in them than any who is simply a business man could

create, have joined the ranks of professional photographers. Let us hope that their artistic success will be accompanied by a success of another kind, and that as the years roll on, would-be sitters will be attracted by good work rather than the bait of colored enlargements given away for nothing, and that youths of artistic taste will be the most likely to succeed with photography as a calling.—F. M. S. in *Photography*.

A Prize Competition.—The Boston Camera Club, representing a gentleman of high standing in matters pertaining to Aerial Navigation, is authorized to make the following offer of prizes for instantaneous photographs of large soaring birds: A prize of One Hundred Dollars (100) is offered by the Boston Camera Club for the best instantaneous photograph of a large bird in the act of soaring. An additional prize of Fifty Dollars (50) is offered for the greatest number of instantaneous photographs, offered by one photographer, of large birds in the act of soaring. By "soaring" is meant the attitude of the bird in the air when no wing motion is apparent. The purpose for which the photographs are desired,—namely, the study of wing-angles, and a possible movement unappreciable to the eye of the observer—necessitates that the figure of the bird should be at least half an inch long on the print. If the figure is small, but clearly defined in detail, enlargements will be preferable to contact-prints, and will be judged of equal merit with direct prints. Careful notes should be written on the back of each picture, detailing the appearance to the eye, the quickness of the shutter, the angle of camera, etc.; also the full name and address of the contributor. Two prints of each picture should be sent. All contributors must prepay the transportation charges of their exhibits (which may be simply card mounts), and in no case will they be returned. Photographers throughout the world are cordially invited to compete. This offer remains open until October 1, 1896; but if on that date at least 100 different photographs have not been received, the limit of time may be extended, of which due notice will be given. All contributions should be sent to the Boston Camera Club, 50 Bromfield Street, Boston, Mass., U. S. A., and marked "Cabot Competition." For further information apply to Mr. Samuel Cabot, care of Boston Camera Club at above address.

PRACTICAL SUGGESTIONS ON TIN-TYPING.

THE Messrs Hyatt, of St. Louis, Mo., have issued a neat pamphlet, giving the following practical suggestions for tin-typing.

Suggestion No. 1.—Preparing the silver bath: Provide a glass bath and box with a rubber dipper for immersing your plate in the solution. Then dissolve 4 ounces nitrate of silver in 42 ounces of distilled water. When thoroughly dissolved, test with a hydrometer. It should test about 40 grains of silver to the ounce of solution. Then add a small piece of iodide of potassium (about the size of a pea); shake well, and add about 10 drops of nitric acid, C.P., or enough to turn blue litmus paper slightly red, which is an indication that the bath is acid. Now filter the bath very closely through absorbent cotton, after which the bath will be ready for use.

Suggestion No. 2.—Great care must be taken with the silver bath to keep it free from foreign matters of all kinds, such as hypo, iron or even an over supply of iodide of potassium or nitric acid. Most any of the above is sufficient to cause discord and cause trouble, in which case we refer you to suggestion No. 5.

Suggestion No. 3.—In the start of a new bath, you will observe that the tin-types you produce are inclined to have a slight scum or web over them. Don't try to doctor the bath by adding more acid or iodide, but let it act so, and in a short time it will produce the finest results.

Suggestion No. 4.—After working bath very hard, test it with the hydrometer, and if it tests below 35 grains, then take 4 ounces of distilled water, or more if you wish, and pour the bath into the water, *not the water into the bath*, shake the solution well and filter. After it is filtered then add nitrate of silver until the hydrometer test is 40 grains. Your bath will then be ready for use in the morning. This work should be done each evening after a day's work.

Suggestion No. 5.—You should always have extra baths on hand. While working one have the other baths in bottles and hung up by a string tied around the neck, or standing in some safe place where the sun will shine on them as much as possible. When No. 1 gives out, bring in No. 2, filter it, and it will be ready to take the place of No. 1. You will find sunlight a good doctor for the bath, whether new or old. In case the bath has become so worn out and contaminated with organic matter, you will have to resort to the last measure, viz., that of boiling or evaporating it. To do this use a porcelain evaporating

dish and boil or evaporate the solution into almost a dry state. After the dish has cooled off, you can re-dissolve the contents in distilled water, filter, and treat the solution as described in Suggestion No. 1.

If you will adopt and adhere strictly to the foregoing suggestions as given, we assure you that you will have no trouble with the bath or the action of the chemical, and your success will be crowned.

Suggestion No. 6.—Make fresh developer at least twice a day, and never allow the developer made one day to be used the next, as its power to do good work has left it. The cost is mere nothing. Mix your developer according to the following formulæ:

DEVELOPER FOR POSITIVE COLLODION.

Water Dist,	32 ounces.
Proto Sulphate Iron,	2 "
Alcohol, 98 per cent.,	2 "
Acetic Acid, No. 8,	2 "

DEVELOPER FOR EXTRA RAPID COLLODION.

Water Dist,	16 ounces.
Proto Sulphate Iron	1 ounce.
Acetic Acid, No. 8,	$\frac{1}{4}$ "
Alcohols 98 per cent.,	$\frac{1}{2}$ "
Lightening,	18 grains.

Lightening is a compound by the use of which the exposure can be shortened to fully one-half the time required for the usual method. With Extra Rapid Collodion and Lightening you cannot help catching the babies every time.

Suggestion No. 7.—The bath, collodion and developer should be alike in temperature as nearly as possible all the time. This can be done by placing them in a suitable vessel filled with water, either warm or cold, as required. From 65 degrees to 75 degrees Farenhdit is about right.

Suggestion No. 8.—The fixing bath is composed of cyanide of Potassium (a rank poison) and water. There is no special directions as to strength, but the stronger the solution the quicker it acts. We would advise, however, slow fixing.

Suggestion No. 9.—Tinting, coloring and varnishing is done after the plate is thoroughly washed and dried. Use the dry colors made for the purpose, A mixture of carmine and flesh color is used for the lips and cheeks. The varnishing is the last operation. Use Ayolar Ferrottype Varnish; flow it carefully over the plate and drain it off into the bottle; allow it to dry by a gentle heat. The varnish dries with a beautiful gloss.

DANGEROUS.

BACKED by such a competent authority as the *British Druggist*, the following information about sundry every-day chemicals used by photographers may prevent some careless experimentalist from being blown up:—

POTASSIUM CHLORATE.—This is probably more often the cause of explosion than any other chemical which is handled by pharmacists. It should never be mixed in the powdered state with organic substances; even in very small traces in "saline" it is apt, after a time, if all the ingredients and the containing bottles are not absolutely dry, to burst the bottle and violently scatter the contents. It should never be mixed dry with tannin. Occasionally a gargle is ordered containing these ingredients; they should always be dissolved separately. Hypophosphites and chlorate similarly explode when mixed in the dry state. Chlorate of potassium and glycerin alone should never be dispensed nor should it be combined with sulphur or the metallic sulphides.

Permanganate of potassium is another source of danger, for the same reason as chlorate—it so readily gives up its oxygen; consequently, it should not be mixed with any organic bodies, such as sugar or glycerin, nor with spirit of wine or spirituous preparations. When ordered in the form of pills, it should be massed with kaolin and petrolatum.

Glycerin, in addition to the cases above mentioned, should not be combined with chromic acid, nor with borax together with alkaline carbonates.

Turpentine and volatile oils containing terpenes should not be combined with strong mineral acids, nor with iodine or bromine.

Iodine should never be mixed in the free state with any preparations containing free ammonia, especially when combined with fatty matter.

Oxide of silver, sometimes ordered in the pilulae form, should be massed with kaolin and petrolatum, and no chloride combined with it.

Spirit of nitrous ether frequently becomes very acid in keeping; in this state when mixed with carbonates or bicarbonates, it liberates carbonic anhydride, and, if tightly corked, the bottle is frequently burst. Such a mixture should not be corked immediately after mixing. Excess of acid in the nitre may be removed by keeping a large crystal of sodium bicarbonate in the stock bottle, occasionally easing the stopper.

Conventions and Exhibitions.

PHOTOGRAPHIC ASSOCIATION OF OHIO.

[COMMUNICATED.]

SPRINGFIELD, OHIO, May 15th, 1895.

The Fifth Annual Convention of the P. A. of O. will meet in the City Hall, Columbus, O., on July 23d to 25th inclusive, 1895. To those who have attended the previous conventions of the P. A. of O. it is only necessary to assure them that the former high standard of excellence will be maintained this year, and I would respectfully urge every live photographer to bring a small display and see the wealth of pictures that will be on exhibition. The association is endeavoring to raise its members to a higher plane of art photography, and with this idea in view appointed a committee last year to report to the officers a plan for conducting a "saloon."

The committee have reported plans which will be carried into execution at our convention this year.

First.—The object of the association, as I have stated, is to elevate its members in art photography.

Hence the appointment of the committee.

Second.—The plan of the saloon will help to instruct every member present this year at the convention in art, by bringing together the choice pictures of the state in one room termed the saloon.

Third.—There will be two artists and one art connoisseur appointed to select from each exhibit such pictures as in their judgment have merit, which will be placed in this saloon. This selection will be made the day previous to the opening of the convention.

Hence it behooves us all to send our display so they will be there on time to be examined for admission into the saloon.

Fourth.—There will be no prize given in the saloon, but the honor of being represented is sufficient compensation for the effort.

Fifth.—In case a picture is taken out of any display that may be competing in any one class, that picture shall be judged as one in that special class, from which it was selected to be placed in the saloon.

We hope that the progressive photographers of the state will appreciate this effort to place our association on a higher plane than to compete for prizes which perish and are soon forgotten.

Ohio leads in successful conventions, and she must still lead in this new department of art instruction. There can be no entries for the

saloon, but every photographer sends his work and this committee will select such as they deem worthy to be placed there.

This method gives the photographer living in small towns an equal chance with his more fortunate brother living in the city.

The officers have not neglected the social and other instructive features, but will endeavor to please all who feel they can still learn something. So I say to one and all, Come to Columbus if you desire a good time and are a photographer who seeks progression.

Yours fraternally,

A. L. BOWERSOX, *Pres. P. A. of O.*

The Protokoll, of the German Photographic Congress, held in Frankfurt a. M., Sept., 1894, has been received. The proceedings make a pamphlet of eighty-three pages, and indicate that our German confreres must have had both a social and lively time during their annual gathering.

International Photographic Exhibition, Salzburg, 1895.—

The exhibition arranged by the German and Austrian Alpine Association (the most important alpine club now existing) and by the club of Amateur Photographers will undoubtedly be the most interesting one of this kind which we have seen till now. The exhibition is intended to show not only the beauty of nature in alpine countries, but also the manners, together with the original dress (costumes) of the inhabitants. The exhibition will last from August 1st till September 15th, and is installed in the palace of Mirabell.

Prizes.—A large list of valuable prizes are offered at the convention of the Photographers' Association of Ohio, which is to be held at Columbus, July 23d to 25th, 1895. Entries to close on Saturday previous to opening of convention. No space will be allowed for exhibits after that time. All exhibits to be sent, all charges having been prepaid, addressed to G. H. Barnum, Secretary P. A. of O., Columbus, Ohio. The competitors in each class are to select three judges. Rules governing the judges in awarding the prizes: 1st, posing; 2d, lighting; 3d, chemical effects; 4th, general effects of finish. It is hoped that every photographer in the state will feel it his duty to go right to work in getting up a display. Each one can get up something original, and can, by showing his work, help in the advancement of one of the grandest arts. The prizes offered are well worth working hard for. Applications for space are to be filled out and sent to W. F. VanLoo, Toledo, Ohio.

Minneapolis Camera Club.—On Tuesday evening, April 2d, 1895, a set of lantern photographs made by the "Society of Amateur Photographers" of New York, were shown.

National Photographic Exhibition.—The National Camera Club announces that a "National Amateur Photographic Exhibition" of the United States will be held in Washington, D. C., July 1st, 2d and 3d, 1895, under the auspices of the club, at Washington Light Infantry Armory, upon which occasion many manufacturers will offer special prizes for *Exhibits* on or with their products. Application for space must be in by June 1st. The committee will then select and mark off same. Amateurs throughout the United States are invited to enter exhibits for competition for prizes offered by the Club. The exhibition is to be devoted entirely to the promotion and interest of the amateur photographer. The club has spared no pains to please every one, as the list of prizes will show, and are satisfied that every competitor who has a meritorious exhibit will be fully rewarded for his efforts and labor. The prizes offered include a diamond badge as the grand prize, and the following as regular prizes, viz., opal diamond pin, fine lense fine camera, gold and silver medals.

A Panic in a Church.—Hermann Warszawiak, who, as a converted Jew, has been conducting missionary work among the downtown East Side Hebrews in New York city, for the past five years, held a meeting on May 25th, in the Church of the Sea and Land, that ended in a panic.

The assembly was composed chiefly of orthodox Hebrews, who had gone to hear what Mr. Warszawiak had to say. When the meeting was over and the congregation poured out of the church, the iron gates in front were found to be locked. Some one shouted that the church was on fire, and a small-sized panic was the result. The occasion for the locked gates was the presence of a photographer across the street, who had a camera placed so that he could take a photograph of the congregation as it came out. It was said that Mr. Warszawiak wanted a picture to show as a proof of his usefulness to the people who support his labors. When the row was at its height the photographer picked up his camera and fled, Mr. Warszawiak also disappeared.

Art Notes.

Stevenson.—San Francisco is to have a memorial fountain to Robert Louis Stevenson. It is to be paid for by public subscription. The design has already been made. A shaft of marble will bear a green bronze capping, supporting a gilt ship under full sail. On the front will be applied a gilt sun dial, while the spigot, lower down, will be of green bronze. On the back of the shaft will be shown the pilgrim's staff and scrip and a flageolet, Stevenson's favorite instrument. The front of the shaft will further bear the words, "To Robert Louis Stevenson," and the beginning of this quotation from his "Christmas Sermon": "To be honest—to be kind—to earn a little and to spend a little less—to make upon the whole a family happier for his presence, to renounce when that shall be necessary, and not to be embittered; to keep a few friends, but these without capitulation—above all, on the same grim condition, to keep friends with himself—here is a task for all that a man has of fortitude and delicacy. He has an ambitious soul who would ask more."

The death of Mrs. Thornycroft, in England, calls attention to a remarkable instance of hereditary transmission of artistic talent in a family. She was herself a sculptress and a public exhibitor, and until she was compelled by old age to give it up, was constantly employed by Queen Victoria at Windsor. She married a sculptor. Her son, Hamo Thornycroft, is an Academician, and one of the most promising of the young English sculptors. His statue, "The Mower," was one of the best produced last year. Her two daughters, Teresa and Helen, are painters of more than ordinary talent, the latter's seascapes being especially well known. The other member of the family, Mr. John I. Thornycroft, branched off from the pursuit of art, strictly speaking,—he is a designer and builder of torpedo boats.

No expense is being spared in the artistic adornment of Boston's Public Library. We learn that the newest addition will be a replica of the "Bacchante," by Frederick MacMonnies, the original of which the French Government purchased for the Luxembourg Gallery. It is to be placed in the courtyard. The statue will stand upon a block of marble, rising slightly above the level, and in the middle of the pool of water forming the centre of the court, from the surface of which it will be reflected.

Machine Photography.—An entirely new process, protected by patents here and abroad, is used in printing the photographs that appear in a new monthly magazine, and by it not long ago 100,000 photographs were printed in one day. The process consists of automatically printing direct from photographic negatives by artificial light on sensitised paper in a continuous roll. The paper is fed under the negatives in a machine that switches the lights on and off for the consecutive exposures, and then carries the paper thus printed to a series of tanks containing the proper chemicals to develop the latent image. Of course the most careful and scientific supervision is imperative for these delicate chemical operations, and the highest ability of the experienced photographer is essential to obtain the best results, since any omission or neglect is multiplied indefinitely. The paper is coated with a gelatine bromide of silver emulsion, and the resultant photographs are excellent bromide prints and absolutely uniform. The automatic features of this method make practical the introduction of photographs in a periodical. Apart from the fact that the cost of photographs made by the ordinary method has hitherto been prohibitive, the impossibility of producing a sufficient number for a large regular edition of a magazine has shut out from practical use this effective means of illustrating.—*New York Sun.*

The war with China has given a great vogue to war pictures in Japan. A large number of these have been sent to this country by Bunkio Matsuki, a young Japanese art dealer of Boston and Salem, who is now on a visit to his native country with his American wife. These pictures are remarkably spirited color prints from wood blocks, and combine the effect of Occidental realism with the principles of peculiarly Japanese art in a way that, while often marked with much crudeness, is not infrequently remarkably powerful and at times impressively poetic. "One of the strongest of these pictures," says the *Boston Herald*, "is that of a Japanese general mounted on a splendid horse, standing on high ground and watching the progress of the battle below. It is a beautiful piece of drawing and military pose, and would be worthy of a Regnault. Such a picture would make the reputation of a painter in the Western world."

The Wood Engraver.—An exhibition of the work of an artistic serious wood engraver, a man well equipped by nature, by experience, and by education to produce on wood with the two or three simple instruments of his craft excellent pictures, recalls the changes that have

been made in recent years toward the simplifying of the process work, the cheapening of the cost of reproduction, and the opening up of a new field of illustration by half-tone.

With the advent of the half-tone reproduction, engraving on wood bids fair soon to become a lost art. The demand for the woodcut has steadily decreased year by year; the lack of encouragement has driven many of the older men into various other channels, younger men have hesitated to take up a calling that offers so little chance for recognition, where even the possibility of making a livelihood is very problematical, and in a few years it will be difficult to find any exponents of this branch of art. While the half-tone has many advantages, and is perhaps in many respects a more satisfactory medium for the reproduction of picture, portrait, landscape, and incidents, making possible much that before was impracticable, still, with the decline of wood engraving, art will be greatly the loser. The charm of the individual interpretation and the original rendering have an attractiveness peculiarly their own which no other medium of expression now possesses. Much as this is to be regretted, the fact nevertheless remains, the future of the engraver on wood offers little promise and few possibilities; the spirit of the age is against him; the photograph brought under intelligent control and utilized by chemicals has usurped his place. We have possibly greater accuracy, and the draughtsman has no longer the refuge of putting the blame on the cutter of the block. What we lose in the beauty of line we gain in the increased number of the illustrations. The law of compensation is inviolate, but so much of beauty, of correctness, and of greater frequency as we get by the new invention will not, to the artistic mind, quite make up for the loss of the personal touch that gave evidence among the best of the workers, of strong and attractive personality.—*New York Times*.

Pictured by Lightning.—Pensecola May 15th.—John T. Wilkerson was struck by lightning in his shop door and killed. He was standing by a telegraph instrument, which was disconnected from any wire, but a loose wire was in contact with his body. The other end of the wire was fastened to a pine tree about 100 feet away. When Wilkerson's body was undressed, a perfect picture of the pine tree, from the top to the point at which the wire was tied, was found photographed on each side just under the arms.

Wiggs—What do you think of my new photographs?

Waggs—I think you ought to pay double price to the photographer.

Somerville Journal

Our Illustrations.

Our Frontispiece.—Only a "blue-print," that is all, and that is what we are proud of,—an every-day blue print, with pure whites and intense blue in the shadows. This specimen is printed under an ordinary negative, and then developed or fixed, as you may see fit to call it, in nothing but ordinary water, that is all; any child can do it, provided it has the paper, so simple is the manipulation. Our illustration shows to what a state of perfection the manufacture of commercial "blue paper" has been brought, coated by automatic machinery any length or width, and all of a uniform quality. It but illustrates another of the rapid strides made of late years in the perfection of the old photographic processes.

Little Curly Locks.—Our extra illustration in photogravure is one of the charming studies of child-life, for which Mrs. N. Gray Bartlett, of Chicago, is so well known. Our subject is out of a work entitled "Mother Goose of '92," published by the Joseph Knight Company, of Boston. Mrs. Bartlett's work of this character, of children, is probably unsurpassed. She works with the full opening of a quick-acting Zeiss lens, making her exposures in a good deal less than a second. The true merit of her pictures consists in the happy arrangement of her groups and light and shade, and the absolute air of freedom from restraint which all her little sitters show. Not one of her pictures gives, in the least, the idea of "sitting for a photograph."

Photography as Art.—"Photographic portraiture," says the *Optician*, "might become still more popular than it is at present among amateurs, if the co-operation of the 'sitter,' or 'model,' with the photographer, in the production of such artistic effects as may be attained, were more generally acknowledged. Considerable difficulties are experienced by some camerists in securing models disposed to subject their persons to all the suggestions of a votary of modern art. But we suppose that the tedium of posing would be robbed of half its distastefulness if the figurante were customarily associated, by name or *nom-de-photographe*, with the supervisor of the 'exposure,' so sharing any artistic triumph that might be won by their common efforts. Opportunities of photographically proving their own powers of 'acting,' or expression, and beauties of form should recommend themselves to stage-struck girls. Again, it is to be remembered that the photographer can readily act as his or her own artistic model, if provided with a suitable pneumatic, or, preferably, electric shutter-release, and aided by a conveniently-placed pier glass."

The Editorial Dropshutter.

In Memoriam.—Alfred M. Collins, the founder of the A. M. Collins Company, the cardboard manufacturers, whose factory is located at American and Oxford Streets, died on the evening of May 26th at his home, 1518 Locust Street, in the 76th year of his age.

Mr. Collins was long known in commercial circles in Philadelphia, and was Secretary and a Manager of the House of Refuge. He was a Director of the Philadelphia National Bank and a member of the Art Club. The interment was private from his late residence.

The loss of Mr. Collins will be severely felt in the mercantile community.

Screen Kinetoscopy.—M. Anschutz, according to the *Deutsche Photographische Zeitung*, has recently shown, in Berlin, a series of projected photographs, chrono-photographically taken, of animals in motion, natural size. No particulars of the system are given. The images are said to have passed across the screen at the rate of 24 a second, the spectator being thus, it is said, able to appreciate the effect of actuality and relief.

The Intending Builder.—The Builders Exchange Association of Buffalo, N. Y., have indorsed that journal as the official organ of their Exchange, and removed their plant to Buffalo May 1st. A large local subscription list has been assured, and with a larger field of operations, and increased facilities, it is hoped to make a still more enviable reputation for the journal in the future.

Shashin-Sowa.—The publishers announce that a great improvement has been made in the *Shashin-Sowa*, the leading photographic journal of Japan, which is published at Tokyo, beginning with volume 3, No. 9, in the matter of introducing an English section to be printed with each number. In connection with this matter Prof. W. K. Burton has promised his kind aid. The able editor, Y. Isawa, remains in charge as heretofore.

The Empire Camera, a neat brochure setting forth the merits of this popular hand camera, which on account of the low prices is destined to become a factor in popularizing hand-camera work. The frontispiece, "On the Brooklyn Bridge," shows the capabilities of the outfit.

[COMMUNICATED.]

NEW CASTLE, PA., May 14, 1895.

TO THE PHOTOGRAPHERS OF PENNSYLVANIA:—This is a good time to agitate the subject of state associations, for if the new constitution and by-laws should pass at the next meeting of the P. A. of A. in August, Pennsylvania, the Keystone state, will be left out in the cold unless something is done. Pennsylvania is a fine large state, (which we all are proud of); we have plenty of first-class photographers, and also those who have the business ability to manage the affairs of a photographic association. A great many of our best photographers have signified their willingness to join and support one if there were just someone to start it along. We read in the journals of the different state meetings, of their great success and good derived from them. I see no reason why Pennsylvania cannot have just as successful an association as our sister states. There is one thing sure, if we want to keep up with the times, we must read the journals, attend the different associations, exchange ideas, see what is new under the sun (for there is where one sees everything new). Go home, put your new ideas to work, and see wherein you can improve.

Now let every photographer from Pennsylvania who can attend the Detroit convention go there determined to help start the ball, and I think before the adjournment of the P. A. of A. in 1895, Pennsylvania will be organized for business. I understand there are some good photographers in Maryland and Delaware who would like to join us. As those states are almost too small to support a society of their own why not take them in and call it Tri-state? There will be plenty of time after some session of the P. A. of A. to get together and organize. I sincerely hope that 1896 will see Pennsylvania hold its first annual convention.

Fraternally yours, E. E. SEAVY.

Photography has long been used for identifying handwriting. The latest process is said to have been discovered by Dr. Bertillon. It is based on the measurement of the beatings of the pulse, which, he says, have in everybody a different and thoroughly characteristic effect on the handwriting. The handwriting, or, presumably, negatives of it, are enlarged till the letters are a foot high, and then the characteristic marks are easily traced.

A recent decision of the Post Office Department forbids the mailing at second class rates of magazines containing photographs pasted on a leaf of the book.

Late Literary News.—Much interest will be felt by the public in the return of Rudyard Kipling to India. He has just agreed to furnish a regular contribution to *The Cosmopolitan Magazine* for the coming year, beginning his work upon his return to India. India has never been critically considered by such a pen as Kipling's, and what he will write for *The Cosmopolitan* will attract the widest attention, both here and in England. Perhaps the most beautiful series of pictures ever presented of the Rocky mountains will be found in a collection of fourteen original paintings, executed by Thomas Moran for the May *Cosmopolitan*. To those who have been in the Rockies, this issue of *The Cosmopolitan* will be a souvenir worthy of preservation. This number contains fifty-two original drawings, by Thomas Moran, Oliver Herford, Dan Beard, H. M. Eaton, F. G. Attwood, F. O. Small, F. Lix, J. H. Dolph and Rosina Emmett Sherwood, besides six reproductions of famous recent works of art, and forty other interesting illustrations—ninety-eight in all.

Waterbury Hand Cameras.—A neat brochure has been issued by the makers of this favorite hand camera, giving a full account of the mechanism and manipulations of the various styles of detective cameras made by them. These cameras can be used with either glass or roll holder, and have always been in favor with the amateur public.

The Photogravure Process, by Henry R. Blanery, with a fine frontispiece by Edwards, Scovill and Adams Company, New York. This is the latest issue of the Scovill Photographic Series. It gives, as the title indicates, a clear and comprehensive account of the photogravure process, the most beautiful of all photo-mechanical reproduction processes. It is an important addition to the valuable photographic series of which it forms a part. The price, fifty cents, places the work within the reach of every photographer.

Pay your debts promptly.

Be brave in the struggle of life.

Order is heaven's first law.—*Pope*.

When we stop being stingy God can be liberal.

There are always some rare bargains at the meat market.

Society Notes.

California Camera Club.—The members of this active organization have had a busy season of it thus far, with the indications pointing to still greater activity as the coming season progresses. Among the special features during the past winter and spring there was a demonstration on developing instantaneous exposures with amidol and metol by Dr. Passavant. On March 5th, a set of slides kindly loaned to the Club by Mr. W. R. Hearst, illustrating Egypt and Egyptians, were shown. These slides were made by Levy, of Paris, from negatives made by Mr. Hearst, and include some flash-light views of tomb interiors which have never before been photographed. Mr. George Pancoast, who accompanied Mr. Hearst upon his travels, described the scenes and related some of the incidents of the journey.

March 6th, Fred. P. Swasey gave a demonstration on developing with pyro and potash and pyro and soda.

April 10th, 1895, a set of slides received from the Photographic Society of the North of France were shown:

April 17th, 1895, Mr. A. B. Post, Demonstrator for the Ilo Company, gave a demonstration on "Printing on Ilo Paper."

April 26th, the fifty-ninth illustrated lecture was given at the Metropolitan Temple by Mrs. H. B. Steele.

May 1st, 1895, Mr. A. B. Post, representing the Ilotype Company, gave a demonstration on Gloss Surface Ilo Paper.

Boston Camera Club.—This Club held its seventh annual exhibition of photographs, the work of members, at the Club rooms from April 3—20 ult. A handsomely illustrated catalogue was gotten for the occasion. There were 179 entries by 35 exhibitors, and judging from the specimens in the catalogue, this club has certainly not degenerated by their withdrawal from the tripartite agreement.

Newark, N. J., Camera Club.—At the annual meeting of the Club the following officers were elected: President, Wm. Archibald; Vice-President and Secretary, D. S. Plumb; Treasurer, J. M. Foote. Executive Committee, P. L. F. Thiery, H. W. Smith, A. C. Munn, W. A. Halsey, F. S. Olds, F. A. Shuetz, Miles I. Anson, Colonel Clark, A. Van Winkle. The club has moved into its new rooms in the Columbian Building, 224 and 226 Market Street.

The Society of Amateur Photographers of New York.—The Second Annual Members' Exhibition of Photographs was held at the Society's rooms, 111-115 West Thirty-Eighth Street, during the last week in March, and proved a great success.

Camera Club Cyclists.—At a meeting called for the purpose, held Thursday evening, April 18, 1895, there was perfected the organization of a cycling annex to the California Camera Club, to be known as the Camera Club Cyclists. The membership will be confined to the active, associate and subscribing members of the California Camera Club.

The Photographic Society of Japan.—A regular meeting of the above-mentioned Society was held at the rooms of the Geographical Society (Chigaku-kiokia) Nishikouya-cho, Kiobashi-ku, Tokyo, on Tuesday, January 29th, at 5 p.m., Mr. K. Ogawa in the chair. The business part of the minutes of the last meeting were read and approved. Mr. R. Konishi showed a "Moderate Power Tele-photographic lens," consisting of a Rapid Rectilinear of $8\frac{1}{4}$ inches focus, with a negative element of 4 inches focus by the same maker. The Rapid Rectilinear was fitted with a pair of the new Burchett colour screens, one green, the other yellow. These are used for getting orthochromatic effects, which it is claimed can be got with their aid, even on ordinary plates. Mr. Konishi presented to the Society samples of "Academy" and "Special Portrait Plate," as well as of Orthochromatic plate. These were handed over to Mr. W. K. Burton, who was instructed to test them, and to report to the Society at his earliest convenience.

Some New Meanings.—Gentleman—A young man of leisure who lives on his father's money and his grandfather's reputation.

Politician—A man who will sell all that he hath and go and buy an office therewith.

Statesman—A politician who is on the winning side.

Fad—Something everybody does because somebody else does.

Idea—A *rara avis*, found now and then among courageous men.

Conviction—An idea in possession of a man called a crank.

Pessimism—Crying because everything don't go our way. A spirit that finds no good in anything else because there is no good in us.

W. I. Davenport, in Recorder.

Photographic Hints and Formulæ.

A Developer for Process Work.—In the formulæ for above, published on page 234 of last month's JOURNAL, the quantity of water given for solution "B" should read Water, 1 quart.

Japanese Cyanotype Process.—Mr. K. Nakahara, at a late meeting of the Photographic Society of Japan, showed a cyanotype print, much superior to anything of the kind generally seen. It was from a mechanical drawing, line sectioned, and showed deep black clear lines on a perfectly white ground. Mr. Nakahara described the precautions necessary to get this effect, and the difficulties that were likely to be met with. Briefly put, the process is as follows:—

A paper highly sized should be used. Small sheets can easily be worked, but the difficulty increases greatly with dimensions, a sheet about 20 x 18 being the largest that he had, so far, been able successfully to manipulate. Want of equality in the depths of the lines, and staining in the whites are the defects difficult to overcome. All manipulations are with a view to avoid these.

The sensitizing solution is as follows:—

Gum Arabic,	15 grams.
Water,	110 c.c.
Tartaric acid,	2 grams.
Chloride of sodium (common salt),	9 grams.
Sulphate of iron,	10 grams.
Iron perchloride,	15 grams.

In mixing the solution, the gum arabic is first dissolved in the water by the aid of heat, and the other salts are added while the solution is still warm.

The solution is spread over the surface of the paper with a sponge, and after allowing a little time for it to penetrate the surface all superfluous moisture is removed, using the sponge again, well wrung out. If this precaution be not attended to, the depth of the lines is not equal. The paper is then dried as quickly as possible. If the drying is not rapid, the whites stain.

Exposure is somewhat longer than would be needed with sensitized albumenized paper. The color of the sensitized paper is yellow. During exposure, all but the lines turn to white.

Development is by a plain aqueous solution of gallic acid, the strength of which is not important. Care must be taken not to leave

the print too long in the developer, otherwise staining will result. After development the print is rapidly washed, when superfluous moisture is carefully sponged off the surface. If this precaution be not observed inequality in the depth of the lines will result.

The success of the process would appear greatly to depend on the sponging off of superfluous sensitizing solution and water from the surface of the paper, and on quick drying after sensitizing.

Mr. J. B. Lee, of Northumberland Avenue, London, W., has combined a photographic camera with a magnetic needle in such a manner that when the latent photographic image is impressed, in the ordinary way, upon a sensitive film within the camera, he claims that, at the same time, there is impressed a latent image of a portion of a graduated arc, which indicates the magnetic bearings of objects in the camera's field of view.—*The Practical Photographer*.

RECENT PHOTOGRAPHIC PATENTS.

The following list of photographic patents recently issued by the United States Patent Office is especially reported by Franklin H. Hough, Solicitor of American and Foreign Patents, No. 925 F. St., Washington, D. C.

526,446.—Photographic camera, roll-holding. D. H. Houston, Hunter, N. Dak.

526,445.—Roll-holding camera, folding. D. H. Houston, Hunter, N. Dak.

525,811.—Photograph flash light. A Hemsley, Philadelphia, Pa.

525,849.—Photographs, apparatus for developing. E. F. Mackusick, New York City.

525,991.—Photographic camera, series. K. Mayer, Munich, Germany.

525,458.—Photograph mount. D. R. Hanawalt, assignor to J. Haworth, Philadelphia, Pa.

525,512.—Photographic paper, sensitized. W. H. Prestwich, London, England, Assignor to Eastman Kodak Co., Rochester, N. Y.

505,608.—Photographic print-mounter. H. A. Lesure and D. D. Dunkle, Greenfield, Mass.

525,624.—Photographic view-finder. J. J. Hicks, London, England.

LIVE POINTERS FOR YOUNG PHOTOGRAPHERS.

KEEP your business to yourself. If your business is good it is good for you; if bad, nobody will trouble himself on your account to make it better.

Keep your stock and property insured in a good company.

If you wish to start in business, look for a good location. Don't be in haste about it. Seek till you find a location to suit you. Don't go to a place where there is no railroad.

Too much saving of expenses is not good. If you are afraid of expenses, you will not prosper.

If you have the means to conduct business without a partner, go it alone. If you cannot manage the business alone, then secure a good partner or employ only good assistants.

Don't attend to too much business outside your regular business. It is not well to have too many irons in the fire.

Don't regard any account as cash until you have the money in hand. If anybody gives you the choice between cash and waiting a while for payment, take the cash.

Kind feelings may be paid in the same coin, but debts must be paid in cash. Pay as you go. Keep ahead rather than behind the times.

If you claim any allowance from your stock house, write promptly and state the facts plainly. Do not wait till the drummer comes again before rectifying the mistake.

Have order, system, regularity and promptness in your business. Use your own brains rather than the brains of others. Do not meddle with business you know nothing about. A man of honor respects his word as he does his bond. No man will get rich sitting around in saloons.

Help others if you can, but never give what you cannot afford simply because somebody else gives as much.

Avoid bad company. Never sign a paper of any kind without reading it.

Lastly, do not fail to subscribe to THE AMERICAN JOURNAL OF PHOTOGRAPHY. Read the advertisements as well as the matter and note anything of value to you.

BARGAIN LIST.—JUNE, 1895.

PORTRAIT CAMERAS.

[For Lenses see Special List.]

- 1—11x14 Portrait Camera, with 8x10 attachment, . . . \$60 00
- 2—8x10 D. S. B. Portrait Cameras, each . . . 15 00
- 1—8x10 D. S. B. Portrait Camera, with Benster Holder, . . . 25 00
- 1—14x17 D. S. B. Portrait Camera, 40 00
- 1—5x7 Victoria Camera, 4 ¼-lenses, . . . 18 00
- 1—5x7 Victoria Camera, . . . 8 00
- 1—5x7 Victoria Camera, . . . 9 00
- 1—5x8 Stamp Camera . . . 15 00
- 1—5x8 Wet Plate Stereo. Camera, 3 holders, . . . 20 00

VIEW CAMERAS.

- 1—5x7 New Model Outfit new . . . 9 00
- 1—6½x8½ View and 2 holders . . . 8 00
- 1—6½x8½ S. S. View Camera, Shutter and Eagle Lenses, . . . 35 00
- 1—4x5 New Model Improved Camera, . . . 11 90
- 1—8x10 View Camera and Holder, new, . . . 16 00
- 1—5x8 New Model Camera, . . . 10 00
- 1—8x10 Eastman Reversible Back Camera . . . 25 00
- 1—6½x8½ Novelette Camera, new, . . . 20 00
- 1—5x8 Blair Single Swing View Camera . . . 15 00
- 1—6½x8½ American Optical Co.'s View Camera, . . . 20 00
- 1—5x7 Blair Rev. Back Camera, new . . . 25 00
- 1—5x8 Boston Rev. Back Camera, new . . . 25 00
- 1—¼ Eclipse Outfit, . . . 2 00
- 1—5x8 '76 Camera, Holder, Tripod, and Case, . . . 23 00
- 1—5x7 View Camera, . . . 7 00
- 1—5x8 Blair Rev. Back Camera, and 4 holders, . . . 25 00
- 1—6½x8½ View Camera, 3 holders, . . . 8 00
- 1—14x17 Ideal Camera, holder, tripod, Orthoscope lens and case, . . . 100 00
- Without lens, . . . 40 00

HAND CAMERAS.

- 1—4x5 Tuxedo Folding, 4 holders 12 00
- 1—No. 1 Kodak, . . . 10 00
- 1—A Ordinary Kodak, new, . . . 5 00
- 1—5x7 Folding Kodak, new, . . . 55 00

- 1—4x5 Climax Detective, new, . \$18 00
- 1—4x5 Turnover Detective, new, 15 00
- 1—4x5 Montauk Detective, new, 18 00
- 1—4x5 Hawkeye, Darlot lens, 3 holders, list \$33, . . . 18 00

ACCESSORIES.

- 1—Magic Camera Stand . . . 6 00
- 1—Seavey Balustrade . . . 5 00
- 1—Seavey Vase . . . 2 00
- 6—5x7 Printing Frames, each, . . . 25
- 10—6½x8½ Printing Frames each, . . . 35
- 1—10-in. Burnisher, double roll . . . 8 00
- 1—14 in. Drag Burnisher, . . . 5 00
- 3¼x4¼ Washing Boxes, each, . . . 50
- 5x7 and 5x8 Washing Boxes, . . . 1 00
- 1—8 ft. Show Case . . . 12 00
- Large Oak Show Frames, each . . . 5 00
- 1—8x10 Knickerbocker Stand, . . . 5 00
- 1—Corner Chair, Velvet, list \$20, . . . 10 00
- 1—Cooper Enlarging Bromide Lantern, 8 in condenser . . . 35 00
- 1—11-in. Acme Burnisher, . . . 12 00
- 1—14-in. Eureka Burnisher, . . . 18 00
- 1—15-in. Improved Eureka Burnisher . . . 25 00
- 1—15-in. Acme Burnisher, . . . 20 00
- 1—Acme Print Trimmer, new, . . . 10 80
- 1—Baldwin Print Cutter, new, . . . 14 00
- Lot of Picture Mats. Write for particulars.
- 1—14x17 Printing Frame, . . . 1 25
- 1—18x22 Printing Frame, . . . 2 50
- 1—11x14 Printing Frame, . . . 1 00
- 1—8x10 Printing Frame, . . . 40
- 1—10x12 Adaptable Washing Box . . . 3 00
- 1—14x17 Adaptable Washing Box . . . 4 50
- 1—19x24 Deep Agate Tray, . . . 5 00
- 2—6x8 Children's Backgrounds, . . . 3 00 and 4 00
- 2—8x10 Bryant Backgrounds, . . . 6 00 and 7 00
- 1—Wall Accessory, . . . 4 00
- 1—Daisy Foreground, . . . 4 00
- 1—Seavey Swiss Cottage . . . 8 00
- 1—Osborne's Rock Accessory, . . . 10 00
- 1—Osborne's Pillar Accessory . . . 15 00
- Lot of second-hand backgrounds, 8x10 and 6x8, \$3.00 to \$6.00; write for particulars.
- Peerless Varnish Pots, each . . . 40
- Full line of Packard Brothers' Grounds in stock. Interiors \$5.00; exteriors, \$4.00.
- 3—Junior Ruby Lamps, each, . . . 60
- 1—4¼x5½ Negative Box . . . 35
- 1—Walmsley Reversible Finder . . . 2 50
- 1—Card-size Burnisher . . . 3 00
- 1—8x10 Porcelain Tray, Shallow, . . . 41

1—8x10 Porcelain Tray, Deep, . . .	50	1— $\frac{1}{4}$ Voigtlander Lens, . . .	40
1—Dana Chair, new, . . .	6 50	1— $6\frac{1}{2}$ x8 $\frac{1}{2}$ Gundlach Single Lens . . .	3 50
1—Divan, Small, new, . . .	3 00	1—5x8 Gundlach Star Lens, . . .	12 00
1—No. 2755 Rattan Chair, new, . . .	6 50	1—8x14 Gundlach Star Lens, . . .	10 00
1—Magic Camera Stand, . . .	7 00	1—11x14 Darlot R. H. Lens, list	
2—22x28 Moorehouse Display		\$45, . . .	30 00
Albums, each . . .	10 80	1—5x8 Darlot R. H. Lens, . . .	15 00
1—Williams Flash Lamp, . . .	75 00	2—4x5 Darlot R. H. Lens, each . . .	10 00
2—Air Brushes, complete, good		1—10x12 Blair Orthographic, . . .	20 00
as new, . . .	25 00	1—5x8 Wide Angle Lens, . . .	5 00
Bargains in Lenses.			
1—4x4 Portrait Lens . . .	10 00	2— $6\frac{1}{2}$ x8 $\frac{1}{2}$ Wide Angle Lens, ea. . .	8 00
1—4x4 Darlot Portrait, . . .	12 00	1—11x14 Wide Angle Lens, . . .	18 00
1— $\frac{1}{4}$ H B and H Lens, . . .	3 00	1—Pair Waterbury Stereo Lenses, . . .	4 50
1—3 B Dallmeyer lens for cabi-		2—R. R. Detective Camera Lens, . . .	3 00
nets, . . .	\$130 00	1—Set 1-9 Gem Lenses, . . .	16 00
1— $\frac{1}{2}$ -Size Dallmeyer lens for		1— $\frac{1}{4}$ Gem Lens, . . .	1 50
cabinets, . . .	50 00	1—4-4 Jamin Globe Lens, . . .	12 00
1—8x10 Dallmeyer R. R. Lens,		1— $\frac{1}{4}$ Holmes, Booth & Hayden, . . .	4 00
list \$74, . . .	45 00	1— $6\frac{1}{2}$ x8 $\frac{1}{2}$ E. A. Single Lens, . . .	5 00
1—5x7 Euryscope Lens, Prosch		1— $6\frac{1}{2}$ x8 $\frac{1}{2}$ Single View Lens, . . .	3 50
Shutter, . . .	35 00	1—5x8 Single View Lens, . . .	2 00
		1— $6\frac{1}{2}$ x8 $\frac{1}{2}$ R. O. Co's. View Lens, . . .	2 00

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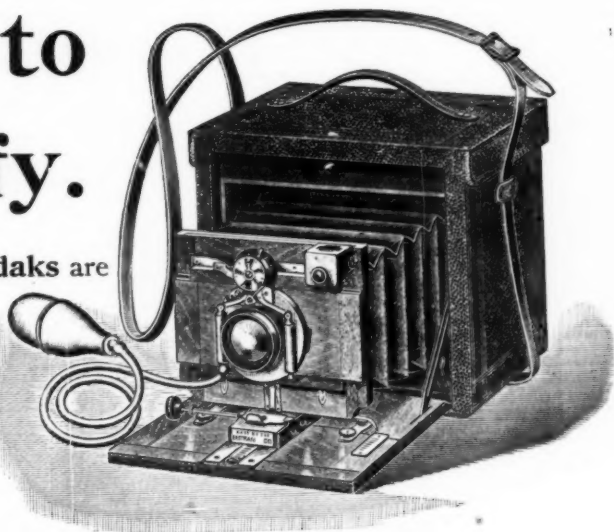
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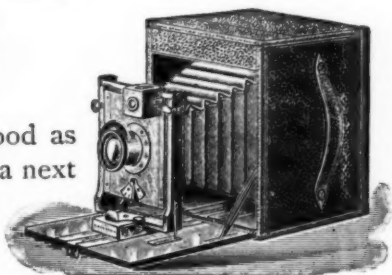
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4 x 5,	". .20
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To any responsible photographer sending us his business card, we will mail photos of these grounds with subjects, being examples of lighting and posing as well.

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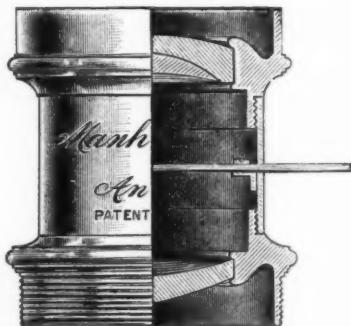
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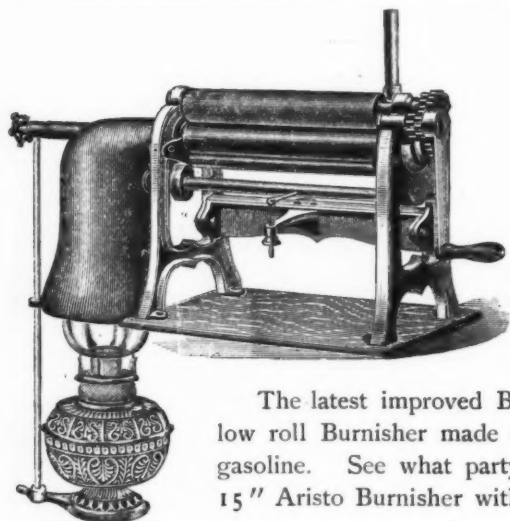



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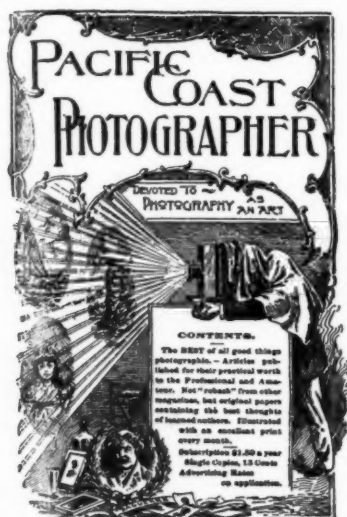
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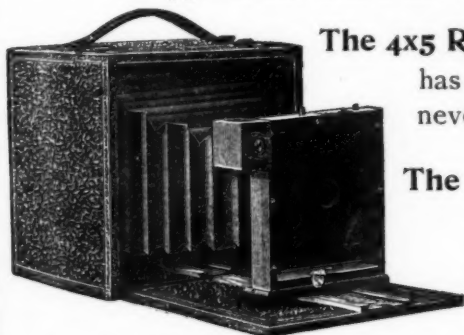
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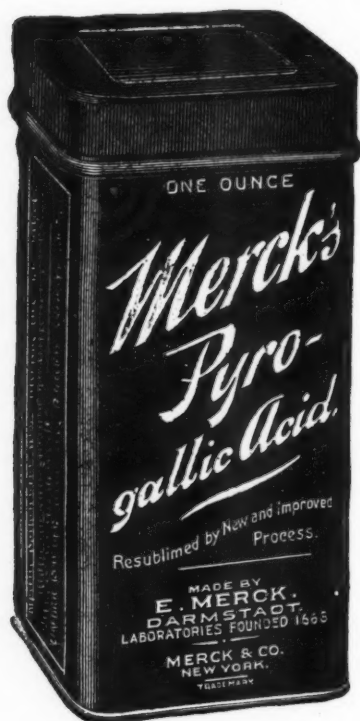
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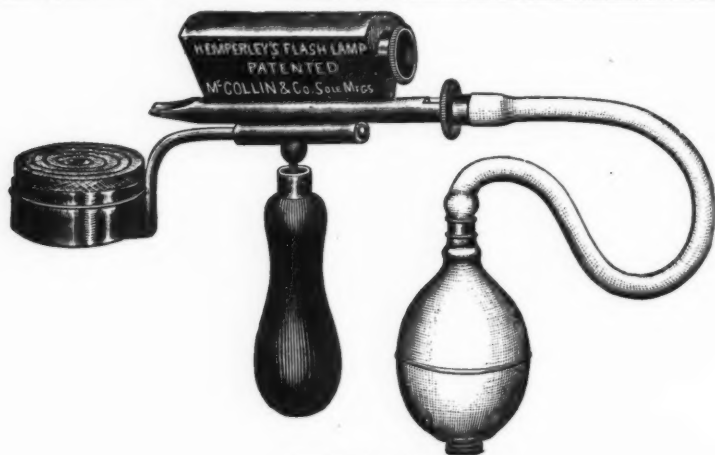
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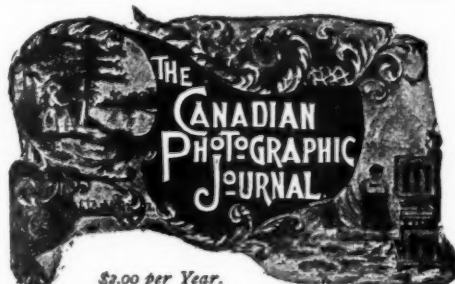
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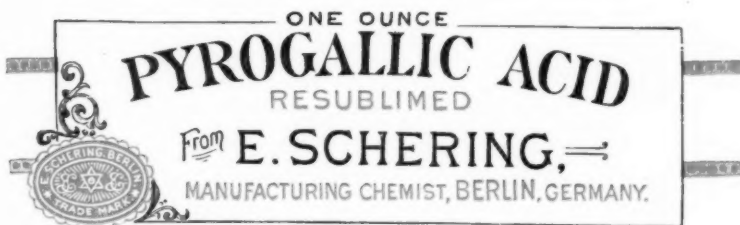
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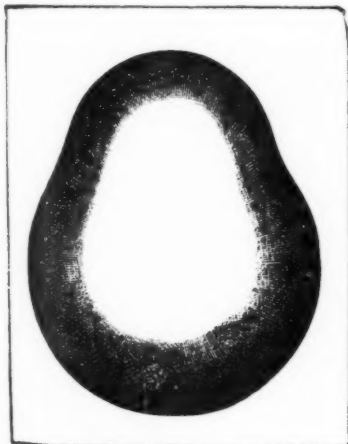
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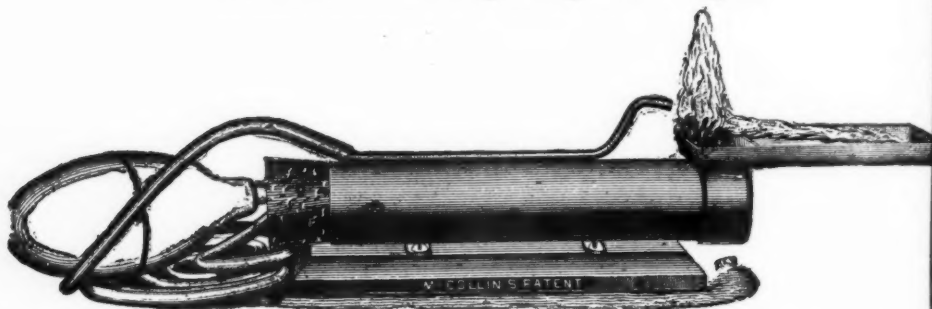
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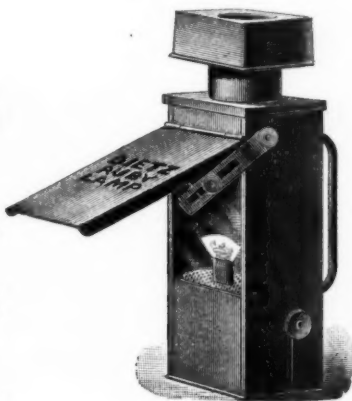
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Acme Cycle Co., Elkhart, Ind.

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Very truly yours,

W. B. WILCOX,
Spokane, Wash.

THE TRANSCRIPT.

Editorial Office. A. P. HOUGH

TRAVERSE CITY, MICH., MARCH 8, '95

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DEAR SIR:—The Light Roadster arrived yesterday, and your letter just now. Everything is entirely satisfactory, and the wheel will be paid for to-day. Electro has not arrived yet, but will be inserted in this week's issue if received to-day. If not will have to go over till next week. I appreciate your prompt and courteous treatment, and will endeavor to satisfy you as well as you have me.

Yours truly,

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ST. JOSEPH, MO., October 6, 1894.

Thos. H. McCollin & Co.

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SAN FRANCISCO, CAL., February 16, 1894.

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[Signed]

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CORTLAND, N. Y., October 8, 1894.

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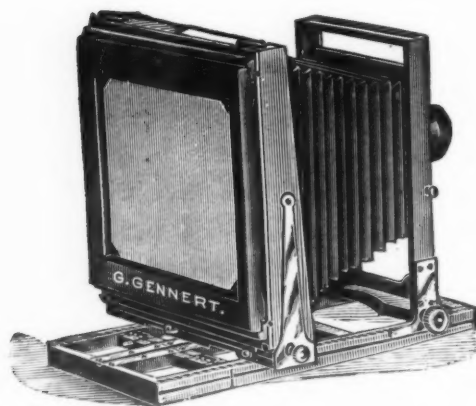
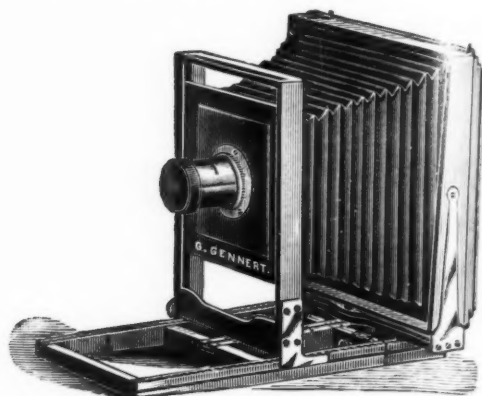
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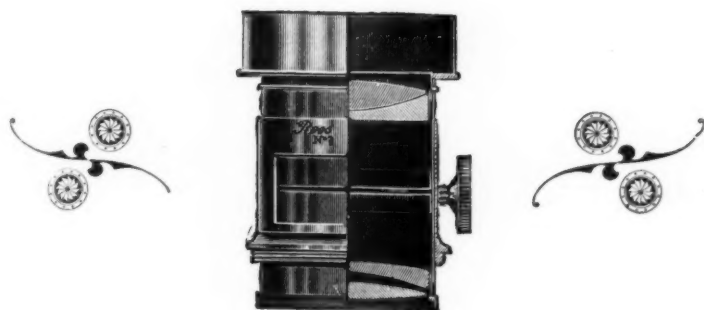


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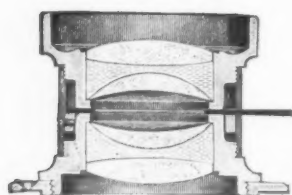
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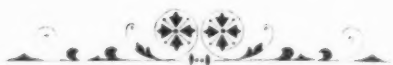
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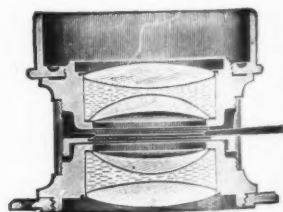
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